

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

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Founder and Editor: STANLEY SPOONER

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list :-

- 1934.
- Feb. 1. " Engine Cowlings." Lecture by J. D. North before R.Ae.S.
 - Feb. 2. Cinque Ports Flying Club Annual Dinner and Dance, Royal Pavilion Hotel, Folkestone.
 - Feb. 10. Services Rugby: R.A.F. v. R.N., at Twickenham.
 - Feb. 16. Bristol and Wessex Ae.C. Annual Ball, Grand Spa Hotel, Clifton.
 - Feb. 16. De Havilland Technical School Annual Ball, Stag Lane, Edgware.
 - Feb. 21. " Development of Aircraft and Its Influence on Air Operations." Lecture by Sq. Ldr. R. V. Goddard before R.U.S.I.
 - Feb. 22. Herts and Essex Ae.C. Annual Dinner and Dance, Wharnclyffe Rooms, Hotel Gt. Central, London.
 - Feb. 23. British Gliding Association Annual General Meeting, at R.Ae.S.
 - Mar. 2. Norfolk and Norwich Ae.C. Annual Dinner and Dance, Arlington Rooms, Norwich.
 - Mar. 15. " Some Developments in Aircraft Construction." Lecture by H. J. Pollard before R.Ae.S.
 - Mar. 21. " Some Problems of a Technical Service." Lecture by Wing Com. G. W. Williamson, before R.U.S.I.
 - Mar. 24. Services Rugby: R.A.F. v. Army, at Twickenham.
 - Mar. 29. " Results from the Compressed-Air Tunnel." Lecture by E. F. Relf, before R.Ae.S.
 - Apr. 5. " Engines." Lecture by Capt. A. G. Forsyth before R.Ae.S.
 - Apr. 27-May 6. International Aero Show, Geneva.
 - May 17-June 2. Royal Tournament, Olympia.
 - May 27. Deutsch de la Meurthe Cup.
 - June 30. Royal Air Force Display, Hendon.

EDITORIAL COMMENT



MR JOHN SIMON continues to labour and to hope against hope that some measure of disarmament may be agreed upon by the nations of Europe. It is even reported that he has convinced Signor Mussolini that disarmament must take precedence of reform of the League of Nations, though with a sensibly-constituted League the chances of avoiding war would be greatly increased. In the meantime it is clear that the Cabinet, as a whole, is convinced that the time has come to put Great Britain's defences in some sort of order, and it is very certain that the Press and the public are of the same mind as the Cabinet. Obviously no good purpose, except that of economy, is served by allowing British defences to rust while other nations pile up their armaments—and such economy (?) may prove very costly. What is more, the Cabinet has decided to consider the question of defence as a whole, and not as three separate sets of Estimates by the three fighting Services. That is distinctly a step in the right direction.

As the time for publishing the three sets of fighting Estimates draws nigh, the protagonists of the three Services are waxing eloquent, each urging the claims of his own pet Service to preferential treatment. Each of the three can undoubtedly make out a very good case. Not one of the three—Navy, Army, or Air Force—is strong enough to play its proper part in defending Great Britain and the Empire in the case of a major war. What is deplorable is that the extremists, at least those who profess to speak for the Navy and the Air Force, are inclined to suggest that if only their own Service were made sufficiently strong, then the country could save money by abolishing the other Service. FLIGHT, naturally, is better placed to hear the views of the air extremist, and such remarks as "Two thousand aeroplanes are worth more than one battleship" have not a few times come to our ears. That sort of remark shows how the recent policy of starving all the Services has driven sensible men to despair and turned reason into frenzy.

At such a time it is refreshing to read the very sane and sensible article on the subject in the *Daily Telegraph* of January 29, written by Mr. Hector Bywater, the naval correspondent of the paper. To read it is like a dose of quinine to a fever-stricken patient. To begin with, he makes excuses for the extremists of each cause, saying that all three Services have been on a starvation diet for years, and that hunger is not conducive to calm judgment. He admits the backwardness of all three Services, and also admits that it is impossible to bring all three immediately up to a full state of efficiency. "Even our long-suffering taxpayers would rebel at the colossal sum needed to restore the Services to a reasonable standard of strength." But a beginning must be made, and in making this beginning the Government must think of the defence of the country and the Empire as a whole, and not show favouritism to any one Service. "As for the spokesmen of the three Services, it is incumbent on them to emancipate themselves from the habit of single-track thinking." These last are words of great wisdom, and we hope that they will be taken to heart.

A great deal of time and energy is wasted in discussions about what is the most important element in fighting efficiency. One hears the same sort of argument taking place inside each Service. In the Army some will say "You cannot do without big guns (or tanks, or engineers, or infantry), and therefore they are the most important thing and the first money available must be spent on them." It is equally true that the Army cannot function without food, and it would therefore be true to say that the most important thing is the Royal Army Service Corps. There are many elements each of which is a *sine qua non*, but to admit that of one element does not prove the lesser importance of some other element. The air extremist says "London is vulnerable to air attack, and if it were destroyed the war would be lost, and so the most important thing is to have an overwhelming air defence force." It is quite true. It is equally true that if the Navy could not defend our trade routes the country would be starved and again the war would be lost; but the naval extremist who says that for that reason all the money should go to the Navy to the exclusion of the Air Force has equally gone astray. Both Services must be strong enough to play their proper part in defence, and the man who would spend the country's all on only one or on only the other, because he personally is interested in the air or in the water, is not a wise adviser. To quote Mr. Bywater again, "It is easy to perceive that a complete enthusiast, armed with plenary power, might with the best will in the world plunge his country into the abyss. . . . An invincible Navy could do nothing to shield London and a third of Great Britain from air attack, the moral effects of which are notoriously out of all proportion to the material damage inflicted. Conversely, an Air Force second to none would be powerless to prevent the starvation of our home population through the wholesale sinking of food ships in the Channel, the Atlantic, and the Mediterranean." In fact, it is incumbent on the sane airman to want to see the Navy strong, and it is equally incumbent on a sane sailor to want the Air Force to be adequate for its duties. When we write "Air Force," we mean the command Air Defence of Great Britain, for the Fleet Air Arm, as its name implies, is part of naval defence. All alike want to see the Fleet Air Arm made stronger, pro-

vided that naval opinion is satisfied that carriers are not unduly vulnerable craft.

Mr. Bywater treads warily in just touching on the subject of whether aircraft attack seriously endangers the battleship or large cruiser. On the one hand, he is a naval correspondent; on the other, he has in this article shown himself a broadminded man, more patriot than partisan. We may certainly agree with him in discounting the proposition of the air extremist, that a warship stands no chance against determined attack by aircraft. This proposition, he says, rests partly on theory and partly on incomplete experiments, which suggest much but prove nothing. Theories usually need the test of actual war before they can be pronounced right or wrong. Mr. Bywater gives it as his considered opinion that mass attack from the air might prove disastrous to a battleship or cruiser of conventional type, but that certain modifications in ship design would much diminish the danger. In other words, he would expect that in war some ships would be sunk by aircraft, but that most of them would survive. That sort of thing is what usually happens when a new weapon is first used in war. It is seldom that any weapon achieves and holds for long the supremacy won by the long bow in the Hundred Years' War.

It would be a useful exercise for FLIGHT and its readers to take Mr. Bywater's advice, to forget for the moment their special interest in aircraft, and to ask themselves candidly "should we be gratified or terrified if it were proved that an Air Force could sink a fleet nine times out of ten?" The air extremists would be able to chuckle and say, "I told you so," but would the safety of Great Britain be increased or diminished by such a result? Probably even the most extreme air enthusiast would confess that in that case his home would be less safe than if the Navy proved itself able to survive. If the British Fleet were to be sunk by enemy aircraft, Great Britain would be lost indeed, and the British Empire would come to an end. It follows that the sentiment which inspires a hope of air supremacy over naval power is misconceived. Patriotic hopes must tend in the other direction.

Of course the real business is to deal with facts and not with hopes, and if it were to be proved that air power had brought sea power to an end, we should have to face the disastrous fact. With real thankfulness of heart we may conclude that our fleet is likely to survive the worst that any enemy aircraft may do to it. That enemy fleets may also survive the attacks of our Air Force is less disturbing, for the British Navy has always been able to deal with enemy fleets, and in any case sea power means less to any European country than it means to us. It follows that we, even we of the aeronautical world, must hope that the coming Estimates will do something substantial towards restoring the efficiency of the Royal Navy, as well as doing something substantial for Air Defence of Great Britain. It is the duty also of those who are interested in the Navy to hope for more A.D.G.B. squadrons in the coming Estimates.

We are not much interested in the calculation which places Great Britain as fifth or sixth nation in number of warlike aircraft. Aircraft are not all of one genus, and there are different functions for the different classes. We repeat, what is chiefly needed for the Royal Air Force is a substantial increase in the number of squadrons in the command Air Defence of Great Britain.

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COMPER "MOUSE" IN ACTION : These photographs, secured at Heston on Saturday last, give a very good idea of the latest Comper machine. Retractable undercarriage and "sunshine roof" are features of the design. The engine is a de Havilland "Gipsy Major." The pictures were secured just before Flt. Lt. N. Comper took the machine to Martlesham for its official tests. A detailed illustrated description was published on September 28, 1933. (FLIGHT Photos.)

AERIAL MAPPING IN GREENLAND

With Danish Heinkel Seaplanes

By Marine-Lieutenant N. V. PETERSEN

(Chief Pilot of the Mapping Expeditions)

The following article, received by the Wakefield Company in London, describes the work of the Danish Aerial Surveys in Greenland during the summer of 1933—the second in their three years' programme. The two expeditions, headed by the Danish Polar explorers, Dr. Lauge Koch and the late Dr. Knud Rasmussen, again used Heinkel seaplanes with Armstrong-Siddeley "Jaguar" engines lent by the Danish Navy Air Service. Two seaplanes were operated in North-East Greenland, under the leadership of Lt. N. V. Petersen, and one machine, in charge of Lt. Erik Rasmussen, in South Greenland. With the help of the seaplanes it was possible to take the ship of the North-East expedition much farther north than would otherwise have been the case. During the last 400 years at least, no ship has been so far north along the north-east coast of Greenland. On one of the flights, Lt. Petersen's seaplane reached as far north as Peary Land, 82° 30' latitude north. Huge mountain ranges, more than 13,000 ft. high, and higher than any previously known mountain peaks in Greenland, were located.

WHEN studying a map of Greenland, the enormous distances of the rugged coastline make an overwhelming impression. And when at the same time it is appreciated how difficult it is to pass or cover these vast uninhabited stretches by ordinary means of transport, such as boats, sledges, skis, etc., it is easily realised that Greenland is a country peculiarly suited to the use of aeroplanes as a means of communication and surveying.

In the beginning of 1932, when we were faced with the problem of mapping the extensive coastline of East Greenland with its many islands and deep and narrow fjords, it was obvious that this should be attempted with aeroplanes. It was evident that surveying this coastline from the ground, where transport even with motor-boats and

sledges was not always possible, would take many years, since each year the only time available for the work was 1½ months during the short summer. But now, with aeroplanes, we have actually succeeded during the two summer seasons of 1932 and 1933 in mapping the whole of the eastern coastline from Cape Farvel to Denmarkshavn.

Before the first expedition started we had no actual experience of flying in Greenland. I had, however, been fortunate enough to accompany the well-known world flier, Herr Wolfgang von Gronau, on some of his Greenland flights in 1931, and this, of course, was of very great value and help to me.

The aircraft which we used for the work were the three-seater Heinkel seaplanes of the He.8 type, which were obtained through the splendid co-operation of the Danish Naval Air Service. These machines were particularly well suited for the purpose; and when one appreciates the severe demands made upon the machines during this work, it must freely be admitted that in every respect they



"WHAT IS ALL THAT NOISE ABOUT?" : Old Bill and his wife seem puzzled.



AN ANGLO-DANO-GERMAN ALLIANCE : The Heinkel ("Jaguar") taking off from a fjord.



"FROM GREENLAND'S ICY MOUNTAINS . . .": The Siddeley "Jaguar" does not seem to mind the cold.

answered our requirements, justifying our full confidence in them, and contributing splendidly to the great success of the expedition.

During the working season the seaplanes were left in the open, exposed to the elements. Harder service and rougher treatment than usual were necessary, as the work had to be forced on, owing to the limited time and the improvised arrangements at the bases. In spite of this, however, the machines stood up to it well, and no incident of any kind happened to delay the work or render the machines unserviceable.

In order to prepare the Heinkel seaplanes for photographic work, a fixed frame was built into the floor of the 3-ft. cockpit. In this frame an "Eagle" camera was suspended. All the photographic flights were carried out at an altitude of 4,000 metres (13,000 ft.) and mostly in temperatures of 20-30 deg. C. below zero. The crew consisted of three—the pilot, the wireless operator and the photographer.

Before the expedition started from Copenhagen, the Geodætic Institute had worked out on a preliminary map the necessary routes and stretches to be photographed. These routes were laid down in such a way that they covered the entire coastline with all the islands and fjords and the land just bordering on the coast. The distance of the route from the coast or land which was to be photographed had to be 15 km. (about 9 miles). From 4,000 m. altitude was then obtained an oblique photograph with some 40 km. (about 25 miles) depth which could be utilised in preparing the final and accurate map. The frequency of the exposures was determined according to the cruising speed of the machine, so that the pictures should slightly overlap, and in this way we obtained about 4,500 photographs.

This aerial mapping of East Greenland formed part of two great scientific expeditions headed by Dr. Laue Koch and (the late) Dr. Knud Rasmussen. The northernmost expedition, headed by Dr. Koch, had two Heinkel seaplanes and two ships, while the other expedition, headed by Dr. Rasmussen, had one Heinkel seaplane and one ship and a big motor-boat at their disposal. Dr. Koch's expedition covered the territory from Scoresbysund to Denmarkshavn, while Dr. Rasmussen's expedition covered the territory from Cape Farvel to Scoresbysund.

While the main object of the aerial expeditions was to map the partly-known country, the seaplanes were put to many other tasks as well—for example, preliminary surveying of hitherto unknown country, "ice reconnaissance" to find open water in which to lead the ships, inspection flights on behalf of the authorities, "mineral flights" to certain mountain groups to ascertain whether minerals were present and to locate such places, and so on.

As Greenland is largely an unknown country, a number of surveying and reconnaissance flights were carried out over territory never seen or studied before, in order that the result of the work should be as complete as possible. On these flights, often extensive, we frequently flew far in across the inland ice, and during the flights up north we



THE AUTHOR OF THIS ARTICLE: Lt. N. V. Petersen, of the Royal Danish Navy, with his wife and son.

would fly for hours over the frozen sea where any possibility of outside assistance in the event of an emergency landing was out of the question. On these flights we invariably carried with us enough food for one month and the necessary equipment for travelling on the ice, so that if forced down we should have a chance of being able to return on foot to inhabited places or to the last base. On one of these flights we reached as far north as Peary Land, 82° 30' latitude North.

In addition to these flights, one of the Heinkel seaplanes flew across the open sea from Reykjavik in Iceland to Scoresbysund in Greenland, and later back to Iceland again. The other seaplanes were taken direct to Greenland by ship.

On the previous (*sic*) Greenland flight in 1932-33 (*sic*) much new land and many new islands and fjords have been discovered. In this connection it is of interest to mention that Hr. von Gronau, in his report of the flight across the inland ice in 1931, mentions two mountain chains to the south-west of Scoresbysund which were not

mapped then. It is a pleasure to be able to announce that a new map of this part will also be issued shortly.

As a first attempt on the part of Denmark at flying in Greenland, it must be conceded that the results have definitely been very successful. But one must be careful not to underestimate the risk of flying in Greenland. This vast country is full of risks and surprises, and the climate is very freakish and deceptive. Sometimes a "high" and clear sky may precede a severe storm which springs up quickly, and entirely without the usual warnings, such as a falling barometer, etc. In the same way, ice drift, calving icebergs and fog often thrust their unwelcome presence suddenly in the way of the flier. But as we with our three Heinkel machines have flown well over 600 hours and covered about 100,000 km. (62,100 miles) without the slightest mishap or accident of any kind, it is obvious, even if we have been cautious and careful—and lucky, too—that the chances of successful seaplane operation in Greenland are not altogether bad.

N. V. P.

A MICRO-RAY LINK

A new ultra short wave, two-way, wireless communication system which has been installed by Standard Telephones and Cables, Ltd., for the Air Ministry for operating between Lympne and St. Inglevert

ON January 26 Sir Philip Sassoon formally inaugurated the Micro-Ray Link, as it is called, between the airports of Lympne and St. Inglevert. He received, by telephone, the following message from M. Delesalle, Sous-Secrétaire d'Etat au Ministère de l'Air:—

"It gives me great pleasure on behalf of M. Pierre Cot, Minister of Air, to inaugurate the new and interesting radio telephone and telegraph link between Lympne and St. Inglevert, which will go far to increase the security of cross-Channel aerial transport and to strengthen the ties, already firmly knit by the bonds of closest friendship, between our two nations.

"I send the cordial greetings of French aviation to British aviation, and express sincere greetings to its distinguished chiefs, Lord Londonderry and yourself."

In replying Sir Philip Sassoon sent the following message to M. Delesalle:—

"I thank you cordially for your kind message of good wishes to British aviation and of greetings to Lord Londonderry and myself, which I heartily reciprocate.

"In inaugurating this Micro-Ray Link I feel certain that it will very greatly assist civil aviation services between our two countries, and thus yet more securely establish the ties which have so strongly subsisted since a French pioneer made the first aerial Channel crossing. May this communication link between the airports of St. Inglevert and Lympne, now established by our interchange of greeting, prove of great service to air transport between our two countries."

The following messages were also exchanged:—

From M. Jacques Vivant, Sous-directeur de l'Aéronautique Civile au Ministère de l'Air, to Lt. Col. F. C. Shelmerdine, Director of Civil Aviation:—

"French Civil Aviation welcomes the inauguration of the Micro-Ray Link, and gladly takes advantage of this new means of transmission to send to British

Civil Aviation a renewed expression of its cordial sentiments and friendly collaboration."

From Lt. Col. Shelmerdine to M. Jacques Vivant:—

"On behalf of British Civil Aviation I cordially reciprocate the expressions of goodwill conveyed by M. Vivant. The new Micro-Ray Link will, I hope, provide yet another means of collaborating with our French colleagues in increasing the safety of cross-Channel air traffic."

Sir Philip had intended flying down, but fog and low cloud prevented him doing so. He therefore left by road in his Rolls-Royce motor car. After he had been gone about half-an-hour the weather conditions improved slightly, and the "Hart" ("Kestrel") from No. 24 (Communications) Squadron, which was to have taken him, proceeded. Ironically enough, but perhaps in vindication of aerial travel, their arrival at Lympne was practically coincident.

This service operates both by telephone and teleprinter, and after Sir Philip had left, this time in the "Hart," the opportunity was offered for those present to send and receive messages. This opportunity was taken, and large numbers of press people and others sent messages to, and got messages from, their friends in France.

The service is one which is being provided and operated

THE AERIALS: A general view showing the reflector towers erected on the buttresses of one of the hangars at Lympne. The actual aerial in each of these reflectors is less than 1 inch long. The reflectors have to be sighted optically on to the receiving station.



LEAVING LYMPNE: Sir Philip Sassoon in the "Hart" ("Kestrel"), by which he flew back to London from Lympe, bidding goodbye to Com. C. T. Deacon, the officer in charge of Lympe aerodrome. (FLIGHT Photo.)

jointly by the British and French Air Ministries, and should result in easing the work of the Croydon and St. Inglevert wireless stations very considerably. At the present time when Lympe wishes to report to St. Inglevert that a certain machine without wireless has circled, intimating that the pilot is flying across the Channel, it is necessary to ring up Croydon by land line and for the message to be sent all the way back to St. Inglevert, from thence by wireless. Now, the operator at Lympe itself will instantaneously be able to tell St. Inglevert when such machines leave. This means that if necessary all matters affecting ground organisation and machines which are not fitted with wireless, can, if the normal wireless service is busy, be sent from Croydon to Lympe by land line and thence to St. Inglevert by Micro-Ray, thus leaving the wireless services of both airports free to deal with the control of air traffic which is fitted with wireless.

A further advantage of the system will be the speed with which meteorological reports can be sent between the French and English coasts. Owing to the present congestion, messages may often take a considerable time during which conditions may change very much indeed. The new service should obviate this difficulty and assist pilots greatly.

The Micro-Ray is a revolutionary system operating on the shortest wavelength which has ever been used commercially, that is, one of only 17 centimetres. The aerials are less than an inch long and radiate less power than is required to light a pocket flash lamp—the wavelengths normally used for aerial and route traffic messages are 900 metres and 1,380 metres.

The whole equipment at Lympe was erected by Standard Telephones & Cables, Ltd., and that at St. Inglevert by the associated French company, Le Matériel Téléphonique of Paris. The wavelengths are slightly staggered, 17 centimetres being used for transmission and 17½ centimetres for reception. This enables two-way speech or simultaneous working by teleprinter and telephones. The Micro-Rays are concentrated by reflectors into a fine pencil of



rays direct towards the receiving station. They travel in a straight line and can only be picked up by a receiver lying directly in their path. Their nature obviates interference of every sort, including atmospheric, and produces a signal of unvarying strength, thus enabling the teleprinter to be used successfully for the first time by wireless. The reflectors at Lympe are erected on the roof of the southern hangar, and are placed in an optically clear line with those on steel towers at St. Inglevert 35 miles away.

Passing of an old friend—

THE aeronautical world in general, and the technical fraternity in particular, will learn with deep regret that, with the end of 1933, the German journal *Zeitschrift für Flugtechnik und Motorluftschiffahrt* ceased publication. One of the earliest of technical aviation journals, the "Z.F.M.," as it was usually called, gradually achieved an unchallenged position among the more highly technical publications, dealing as it did mainly with the theoretical aspects of aeronautics. As the official organ of the Wissenschaftliche Gesellschaft für Luftfahrt E.V. (commonly known as the "W.G.L."), the old "Z.F.M." occupies a position somewhat analogous to that of the *Journal of the Royal Aeronautical Society* in this country, but differed from it in being wider in its scope and carrying news of a technical or semi-technical nature from all over the world. The official organ of the "W.G.L." will in future be *Luftfahrzeugbau und Luftfahrt nebst Randgebieten*. This journal, which has just entered upon its second year of publication, is edited by Regierungsrat Dipl.-Ing. Baatz. The January, 1934, number is a small eight-page paper, comparable in no way with the old "Z.F.M." and carrying no advertisements whatever.

—and the appearance of a new one

No. 1, Vol. I, of the *Journal of the Aeronautical Sciences* has just reached us. This is the American "opposite number" to our *Journal of the Royal Aeronautical Society*, which it somewhat resembles in the colour and type face of its cover. The American publication is, however, somewhat larger (8 in. x 10½ in.), and differs from our *Journal* in that the contents list shows mainly contributed articles and not, as in the British publication, papers read before the institution. Among the contributors to the first number are our own Mr. A. Fage and Mr. A. J. Sutton Pippard. As the official journal of the Institute of the Aeronautical Sciences, Inc., the new publication was expected to be of a fairly highly technical nature, and this is actually the case. The Institute of

the Aeronautical Sciences, which is the American equivalent to our Royal Aeronautical Society, was founded about a year ago. Its first president is Mr. J. C. Hunsaker, who has acted as editor of the first issue of the *Journal*, and the Secretary of the Institute is Mr. Lester D. Gardner. The price of the *Journal* to British subscribers is three dollars per annum, 75 cents for a single copy. Correspondence should be addressed to the editorial offices of the *Journal of the Aeronautical Sciences, Inc.*, 5431, R.C.A. Buildings, Rockefeller Center, New York City, N.Y.

Reorganising German air press

As recorded above, the famous German scientific aeronautical journal "Z.F.M." stopped publication at the end of last year. It appears that there has been a reshuffling of German aeronautical journals generally, as the paper *Luftwacht* has, with the beginning of this year, split itself into three separate publications: *Luftwissen*, *Luftwehr*, and *Luftwelt*. In an introduction to the new publications it is stated that the journals appear at the wish of the German Air Ministry, although it must not be taken that the views expressed are necessarily those of the Ministry. The same phrase, or at least one very similar, is used whenever a British Air Ministry official reads a paper to the Royal Aeronautical Society, and the significance of it in this case may be much about the same. Of the three new journals, *Luftwissen*, which will appear on the 15th of each month, deals with the scientific and technical side, taking to some extent the place of the late lamented "Z.F.M." *Luftwehr* will be published on the first of each month, and deals with military aviation the world over. *Luftwelt* is a fortnightly journal, published on the 8th and 22nd of each month, and deals with civil and commercial aviation. It is claimed that the rationalisation effected will avoid much overlapping of journals previously published. We hope our old friend Oskar Ursinus will not have *Flugsport* "axed." He has ever ploughed a lonely furrow, and one can imagine that he may be faced with serious difficulties under the present régime in Germany.

Air Transport & Commerce

THE 1933 BELLANCA HIGH-SPEED TRANSPORT

A NEW type of ten-passenger low-wing monoplane powered with a Wright "Cyclone" direct-drive Series "F" 650-h.p. engine is being built by the Bellanca Aircraft Corporation. This firm, it will be remembered, has hitherto specialised in high-wing monoplanes. It seems that the low-wing arrangement has been adopted in order that a retractable undercarriage may be used. The fuselage is a combined metal monocoque and welded-steel tubular structure, the monocoque unit providing for the cabin section, while the tubular structure is used for the pilots' cockpit and is a support for the *empennage*. The wing structure incorporates routed spruce spars and laminated plywood ribs. Fabric covering is used. The engine is enclosed in a special adaptation of the popular N.A.C.A. low-drag cowling. An enclosed cockpit for the pilot is located at the rear of the cabin and is fitted with a very wide range of instruments, while the passenger cabin is 11 ft. long and has a maximum width of 5 ft. 2 in. The aircraft is bonded and shielded for two-way wireless. An adaptation of the aircraft known as the "De Luxe Cruiser" has a six-seater cabin arranged for private use. The performance figures of this type are similar to those for the "Transport," which are given below:—

Span	55 ft.	
Length	30 ft.	
Height	9 ft. 10 in.	
	Estimated performance	Guaranteed performance
Max. speed	210 m.p.h.	189 m.p.h.
Cruising speed at 66 per cent. full power	180 m.p.h.	162 m.p.h.
Best climb	1,270 ft./min.	1,000 ft./min.
Range and endurance at sea level	763 miles in 4-24 hr.	600 miles
Service ceiling	20,900 ft.	17,000 ft.
Total guarantee useful load	3,415 lb.	

A HESTON-JERSEY AIR SERVICE

ON Sunday, January 28, the first aeroplane left Heston for St. Helier, Jersey, on a daily service to be operated by the new company, Jersey Airways, Ltd., reference to which has already been made in FLIGHT. A special bus will leave their London office, 17-19, Cockspur Street, at 9.45 a.m., and the aeroplane, a D.H. eight-seater "Dragon," will leave Heston at 10.55 a.m., arriving at St. Helier exactly two hours later. The return service will leave St. Helier at 2 p.m., arriving at Heston at 4 p.m. The fares are £2 19s. 6d. single and £4 19s. 3d. return.

A NEW CHARTER SERVICE

OLLEY AIR SERVICE, LTD., the formation of which has already been notified in our New Companies Registered, will be starting operations at the end of next month, after Capt. G. P. Olley finishes his work with Imperial Airways. A "Dragon" (two "Gipsy Majors") has been ordered with accommodation for from four to eight passengers according to luggage requirements of the moment. This machine will also have a full Marconi wireless equipment

and will carry a wireless operator. It has extra fuel tankage giving a range of 900 miles. The company is proposing to specialise in long-distance charter work of the type which Capt. Olley has been doing for Imperial Airways for a large number of years. One of the first jobs will be a flight to Africa which, with the subsequent journeys there, will occupy some two months. Mr. R. L. Carter has joined the firm to assist with the business side and to look after the ground organisation. The company has an office at Croydon Aerodrome (Telephone: Fairfield 5117).

THE AMSTERDAM-HULL-MANCHESTER SERVICE

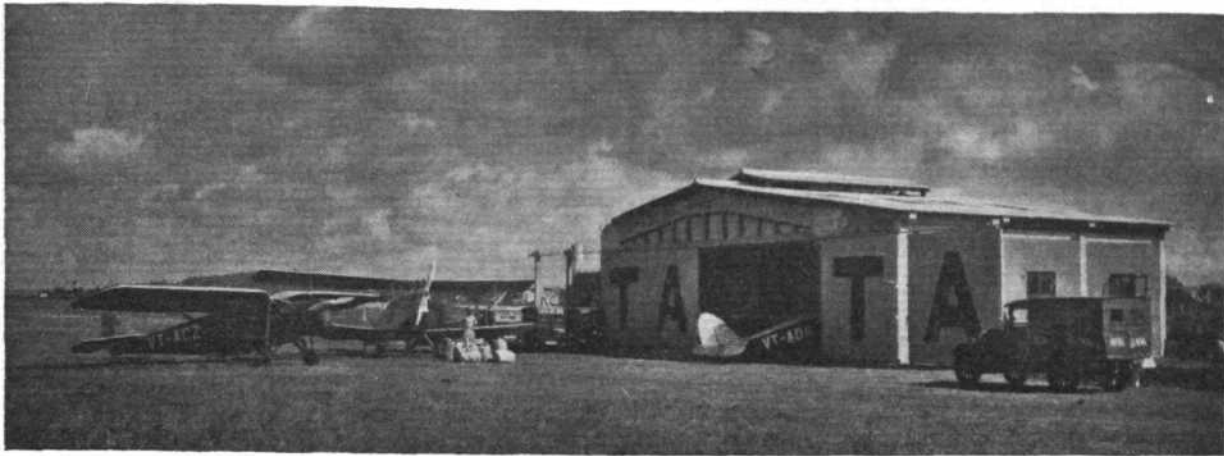
WE understand that a meeting took place at Manchester last week between representatives of the Dutch K.L.M., the Manchester Corporation and Airwork, Ltd., who manage on behalf of the Corporation the municipal airport at Barton-upon-Irwell, to discuss the advisability of extending the proposed North Sea air service via Hull to Manchester. The Barton airport is exceptionally well equipped for such traffic, an important asset being the Air Ministry radio station with direction finding equipment. It was, however, decided not to extend the service to Manchester for the present, owing to the lack of runways adequate for future needs and certain technical problems connected with the locality which render any considerable extension of the landing area of this airport a matter not to be undertaken lightly.

CIVIL AVIATION IN CZECHOSLOVAKIA

THE progress of civil aviation in Czechoslovakia was the subject of a broadcast speech recently by the Minister of Public Works, and the figures he gave show that the country, in proportion to its size and resources, is keeping pace with the advances made elsewhere, not only in respect of the services maintained, but also in the output of air engines and aeroplanes. In addition to the internal services, Czechoslovakia is linked up by air with many parts of Europe and overseas, and in this connection has concluded conventions with Germany, Austria, Italy, Yugoslavia, Rumania and France. Foreign air services crossing Czechoslovak territory include French, Polish, German and Austrian lines, while two Czechoslovak undertakings also take part in home and foreign services—the State Air Lines and the Czechoslovak Air Lines. The total length of the services flown inside Czechoslovakia is 2,348 miles (3,779 kilometres), and as a whole network of new aerodromes is in course of construction that length will in the near future be largely increased. Existing aerodromes are nine in number, several of them possessing passport and Customs offices. The times taken for the various flights are being steadily reduced through the introduction of larger and faster machines, and the speeds already attained compare very favourably with those normally registered on the English, Dutch and German services. In addition to the existing aerodrome at Kbely, near Prague, the capital



THE G.A. 38 : Triple-engined transport which is now going through the shops of the General Aviation Manufacturing Corporation of Dundalk, Maryland, U.S.A.



AN INDIAN AIR TERMINUS: The hangar and offices of Tata Sons, Ltd., at Bombay.

will within two years possess a new civil aerodrome at Ruzyně, on the opposite side of the city. Considerable attention is also being devoted to the question of night services, and illuminated routes are to be inaugurated. Between Prague and Bratislava, for example, 18 air beacons are to be established, and the aerodromes at Prague, Brno and Bratislava fully equipped for landings and starts in the night.

SWISS TRAFFIC FIGURES

THE Federal Air Office at Berne has published the following figures for Swiss international air traffic from May 1 to October 31, 1933:—

—	No. of Flights	Mileage	Paying Passengers	Air Mail	Freight	Excess Luggage
1933..	10,829	1,167,000	32,548	tons 251.0	tons 363	tons 74.3
1932..	10,131	1,116,000	28,441	202.5	349	66.0

Regularity was 98.8 per cent. (98.8 per cent. in 1932) and the punctuality average was 90.5 per cent. (88.5 per cent. in 1932). The average speed on the international connections was 107.5 m.p.h. during 1933, compared with 104.5 m.p.h. during 1932. The express Zurich-Munich-Vienna service was operated throughout the year at an average speed of 161.7 m.p.h. There were no accidents to passengers during the year.

POLISH TRAFFIC

THE following are the traffic figures obtained by the Polskie Linje Lotnicze during 1933. The figures for 1932 are given below for comparison.

—	Airways in Miles	Mileage Covered	Passengers	Freight and Luggage	Air Mail
1933 ..	3,000	1,085,000	13,013	lb. 776,000	lb. 82,500
1932 ..	3,000	770,000	10,232	710,000	86,500

EASTERN AIR TRANSPORT STATISTICS

EASTERN AIR TRANSPORT, which operates the New York-Atlanta-Miami service, states that during 1933 revenue passengers and air express increased by 129 per cent. and 605 per cent. respectively, compared with the previous year. A decrease of 4 per cent. in the amount of air mail carried has been recorded. This is due to the higher air mail postage rates in force (\$0.08 = 6d. for 1 oz.; \$13 = 10d. for every additional oz.).

NEW PAN-AMERICAN EQUIPMENT

PAN-AMERICAN AIRWAYS have announced that the company has placed an order for six Douglas D.C.2 airliners and six Lockheed "Electras." The value of the orders totals £201,760. The D.C.2's will accommodate twelve passengers only, so that greater comfort for long journeys may be obtained than with the cabin arranged to seat the full number of passengers which may be carried.

THE BERLIN-WARSZAW SERVICE

As the result of negotiations which took place in Warsaw from January 16-19, between a German delegation headed by Herr Ministerialdirektor Fisch and Polish representatives, the air route between Berlin and Warsaw will be operated jointly by Deutsche Luft Hansa and Polskie

Linje Lotnicze. The service will be inaugurated during the summer.

A WARSAW-MOSCOW SERVICE IN THE SPRING

AFTER several fruitless conversations between the Soviet Union and Poland, regarding the proposed Warsaw-Moscow connection, it has at last been made known that the first experimental flights for a service connecting these cities, via Minsk, will be made during the spring.

THE FRENCH TRANSATLANTIC SERVICE

FOLLOWING the example set by Great Britain and the United States, French interests, represented by Gen. Duval, former chairman of the Cidna Company, are negotiating with the Portuguese Government regarding the use of the Azores and other Portuguese territory for the proposed transatlantic air service.

STATE AIRWAYS IN SOUTH AFRICA

SOME time ago it was announced that the State Railway Department in South Africa would become responsible for the running of air services in the Union, but it was not at first made clear if this department would only function on the lines of the Civil Aviation Department of the Air Ministry in this country. However, the Cape Town correspondent of the *Daily Telegraph* stated definitely in the January 30 issue of that paper that the South African Government would take over Union Airways, Ltd., as a State Department of the Railways on February 1. Negotiations have been completed, he said, by which overseas creditors would receive 10s. in the pound. He added that the Minister of Railways, Mr. O. Pirow, intends to develop the State airways into a highly efficient system. Among other things, all the pilots will be trained in instrument flying.

AIR MAIL TRAFFIC

THE Postmaster-General announces that the weight of letters sent by air from this country during 1933 was the largest ever recorded in one year and amounted to about 85 tons, as compared with 64 tons in 1932—an increase of 33 per cent. The Christmas letter-mails despatched by the Indian service on December 16 and by the African service on December 13 weighed about 3,000 lb. and about 1,300 lb. respectively—a record for each of the services. Details of the letter traffic are:—

	1932 lb.	1933 lb.	% increase
Indian Air Service (including Egypt, Iraq etc.)	60,000	73,400	22
African Air Service	15,900	24,700	55
Other Extra-European Services	24,400	28,800	18
Continental Services	42,700	64,400	50
	143,000	191,300	33

There was also an increase of 18 per cent. in the amount of parcels sent by air, the figures being 67 tons in 1933 as compared with 57 tons in the previous year.

LONDON-BELFAST SERVICE

It was announced on Thursday last, by Sqd. Ldr. Malet, chief pilot of Midland & Scottish Air Ferries, that an air service between London and Belfast will be inaugurated on March 14. Stops will be made at Birmingham, Liverpool and the Isle of Man.

THE MADRAS-CALCUTTA AIR MAIL SERVICE

A BI-WEEKLY air mail service connecting Madras and Calcutta will start on February 10. Halts will be made at Gannavaran, Vizagapatam and Puri. The service is to be operated by the Madras Air Taxi Service and will connect with the east- and west-bound services of Indian Trans-Continental and Indian National Airways.

THE "EMERAUDE" ACCIDENT

THAT the accident which caused the loss of a number of lives of prominent people in France recently was not due to the machine striking high-tension cables, nor, apparently, to ice formation on the wings, but was due to the breakage of the wings in the air, seems to be the conclusion reached during the official inquiry. As a result of this the French Air Minister has issued certain important modifications in the regulations governing civil flying, some of which will not be too readily accepted in this country. The main conclusion reached seems to be that, although the ill-fated *Emeraude* was well up to C.I.N.A. standards, it was too weak for the weather conditions encountered. At the time of the accident it is estimated that the gross weight of the machine was approximately 9 metric tons, and the maximum permissible weight of the machine was 11 tons. The factor of safety was the prescribed 5 on full gross weight, and must, therefore, have been greater than that on a weight of 9 tons, all of which is taken, in certain French circles, to indicate that a revision of the C.I.N.A. load factors is urgently required.

The sequence of events which led to, and ultimately caused, the accident was as follows: The *Emeraude* had started from Lyon at 6.15 p.m. to fly to Le Bourget, where the machine was expected. The weather report was bad, but Launay, the pilot, had often flown in worse weather, and a start was made. Soon after leaving Lyon the machine met very bad weather, with violent squalls which changed direction frequently. The machine got off its course, and was heard circling over a point some 25 miles south of Corbigny (near the River Yonne). The pilot was evidently endeavouring to ascertain his whereabouts. Somewhere there he lost the weight of the wireless aerial, and from then onwards there was no more wireless communication with the machine. The region around the Morvan Mountains is well known for its atrocious weather, and without radio to guide him the pilot evidently decided that the only thing to do was to make a landing, the buffeting which the machine was getting being such that to fly "blind" by instruments only was out of the question. Some idea of the force of the wind can be gathered from the fact that on the known times of starting and of the ultimate crash, the average speed of the machine was only about 90 m.p.h.

The rest of the story is pieced together from the evidence afforded by the wreckage and by the finding of pieces of wing about a mile or more from the scene of the crash. It is thought quite possible that the machine got into a very violent up-gust and that, as a result of the pronounced flexing of the wings, the aileron hinges broke while the leading edge of the starboard wing (which gave the wing its torsional strength) sheared through, letting air into the wing and blowing away the whole trailing edge, leaving only the spar itself on that side. The result would naturally be a violent swerve to the right, the machine crashing with engines running and probably at a speed at somewhere in the neighbourhood of 250 m.p.h. Launay was a pilot of very long experience (8,000 hours' flying), and no one imagines that he was in any way to blame. It is not even considered probable that the accident was caused by a sudden flattening out after a dive, but simply by flying at high speed into an up-gust of high velocity.

M. Dewoitine himself is reported to have admitted frankly that without doubt the wing broke in the air. He does not even make any attempt to explain away the accident by taking refuge behind some obscure theory of flutter, a fact which, as our excellent French contemporary *Les Ailes*, from which this information is taken, puts it, shows the moral honesty of the famous designer. We in Britain can also admire this moral honesty.

As a result of the accident, M. Pierre Cot, the French Air Minister, has decided to take all possible precautionary measures, from which we mention the following: A new meteorological post, equipped with wireless, is to be established in the Morvan district; the start of every aeroplane carrying passengers is only to be made with the authorisation of the chief of the aerodrome (i.e., the decision not to rest with the pilot), and night flying by civil aircraft is to be reduced to a minimum in bad weather, mail planes carrying no passengers, and strong enough for bad-weather flying, being the only types permitted to start on a night flight in really bad weather. Special studies are to be made of the frequency and intensity of air currents in certain districts. The load factor of aeroplanes is to be calculated more in accordance with the speed and general performance than hitherto. The production of a suitable automatic pilot is to be regarded as an urgent problem requiring immediate solution.



The Armthorpe flying accident

THE Air Ministry announces:—On September 15 last at Armthorpe temporary aerodrome, near Doncaster, a "Dragon" aeroplane, flying for hire, was involved in an accident which resulted in the death of the pilot and minor injuries to two of the six passengers. The aircraft, a twin-engined machine, failed to take off in a normal manner and ran nearly the full length of the aerodrome before it became airborne. It finally collided with the boundary hedge and crashed nose first into the ground. As a result of his investigation, the Inspector of Accidents came to the conclusion that the accident was due to the pilot omitting fully to open the engine throttles when taking off, and failing to realise his mistake in time to avert the accident.

England—Australia Race

THE Royal Aero Club of the United Kingdom has now issued the regulations governing the MacRobertson Race which is scheduled to start from England on or about October 20, 1934. The official regulations do not differ in any essential from those given in the summary published in *FLIGHT* on August 3, 1933, and the formula to be used in the handicap race remains unaltered as published in *FLIGHT* on November 2, 1933. The regulations were finally approved by representatives of the Royal Aero Club and the Australian Commonwealth at a meeting at the Royal Aero Club on January 25, 1934. At this meeting the Royal Aero Club was represented by Mr. W. Lindsay Everard, M.P., Capt. W. Dancy, Lt. Col. M. O. Darby, Maj. R. H. Mayo, and Mr. H. E. Perrin. The Australian Commonwealth representatives were: Air Commodore R. Williams and Flt. Lt. T. A. Swinbourne. The final regulations define a little more clearly the horse-power designated P in the handicap formula. For engines rated at sea level P is the maximum horse-power of the prototype engine at normal r.p.m. at sea level. For engines rated at an alti-

tude above sea level P is taken as the maximum horse-power of the prototype engine at normal r.p.m. at the rated altitude divided by the corresponding height-power factor. Normal r.p.m. is defined as the maximum r.p.m. authorised for continuous running, as established during the approval tests of the engine. For the benefit of those of our readers who have not access to the numbers of *FLIGHT* mentioned above, it may be recalled that the control points (at which landing and checking-in is compulsory) are:—Baghdad, Calcutta, Singapore, Darwin, and Charleville. Refuelling facilities, wireless telegraphy and weather reports are available at all these controls. Entries in duplicate must reach the Royal Aero Club not later than 12 noon on June 1, 1934. The entrance fee is £50 for the speed race and £10 for the handicap race. If a machine is entered in both the fee is £50.

U.S. naval aircraft

THE Naval Committee of the House of Representatives unanimously voted, on January 29, in favour of an amendment to the Vinson Bill to authorise the construction of 1,184 naval aircraft.

Reorganising the Greek Air Force

THE Greek Government, it is reported, is considering the appointment of someone from this country to reorganise the Greek Air Force.

French aircraft production

THE following figures relating to the production of French aircraft are given by M. Louis Hirschauer, Senior Engineer of the Civil Aviation Department of the French Air Ministry. From August, 1914, to the Armistice, France built 50,000 aeroplanes and 90,000 engines. Her monthly output in 1913 was 110 machines and 190 engines, but by 1918 these figures had increased to 30,000 machines and 4,300 engines. France's total expenditure on aircraft material is about twenty-three million gold francs (£920,000,000).

THREE NEW POBJOY ENGINES

90 h.p., 80 h.p. and 70 h.p.

FOR the 1934 flying season Pobjoy Airmotors, Ltd., of Hooton, Wirral, Cheshire, have introduced three new types of aero engine, all of which are now in production. The three types will be known as the "Niagara," the "Cataract" and the "Cascade" respectively, and are all 7-cylinder radial air-cooled engines, with many components in common, but differing in rated power. Two of the engines, the "Niagara" and the "Cataract," are geared, while the "Cascade" is of the direct-drive type. The difference in power between the "Niagara" and the "Cataract" is due to the difference in normal speed, the "Niagara" developing a normal power of 84 b.h.p. at 3,200 r.p.m., and the "Cataract" 75 b.h.p. at 2,900 r.p.m. The maximum powers are 90 b.h.p. at 3,500 r.p.m. and 80 b.h.p. at 3,200 r.p.m. respectively. The direct-drive engine develops a normal power of 65 b.h.p. at 2,600 r.p.m. and a maximum of 70 b.h.p. at 2,850 r.p.m. The respective weights are 145 lb., 135 lb. and 126 lb., exclusive of exhaust collectors and cowling.

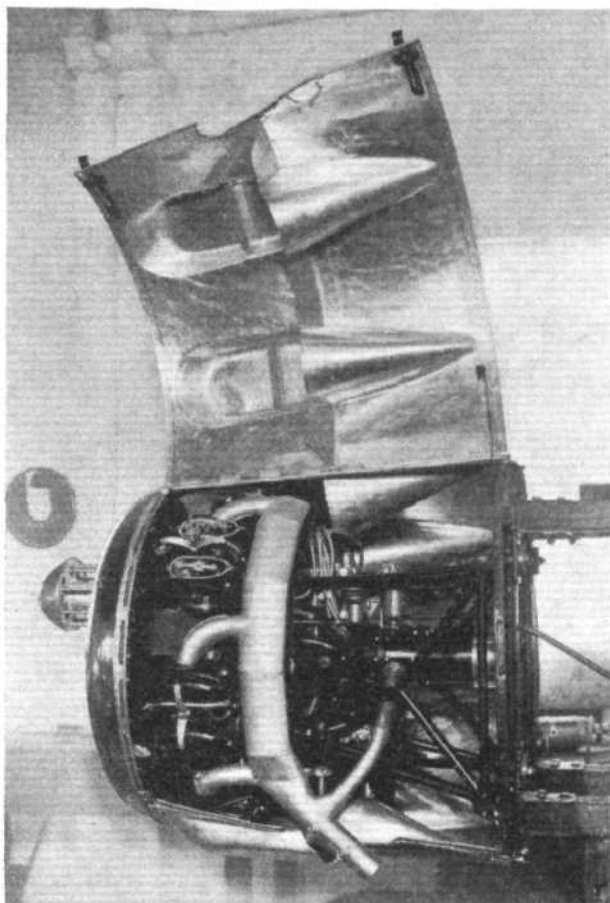
As in previous Pobjoy engines, the weight-power ratios of the three new engines are low. Based on maximum power they are: 1.61, 1.71 and 1.80 lb./h.p. respectively.

All three engines have the same bore and stroke, the swept volume being 2,835 c.c. (173 cu. in.). The maximum horsepower per litre capacity

is 31.75 b.h.p., 28.22 b.h.p. and 24.7 b.h.p. respectively. The lower figure for the "Cascade" is, of course, due to the relatively low speed of the direct-drive engine.

Speaking generally, one may say that the "Niagara" is a new engine, totally enclosed valve gear, and a cowl supplied as part of its standard equipment being but some of the features. The "Cataract" generally resembles the 1933 "R" type engine, but has a redesigned ignition system, improved cylinders, reduction gear and exhaust collectors. It is cheaper than the "Niagara."

The "Cascade" is interesting in being the first direct-drive Pobjoy engine. It generally resembles the "Cataract," but by the sacrifice of about 10 b.h.p. this engine can be sold at a somewhat lower price than the "Cataract."



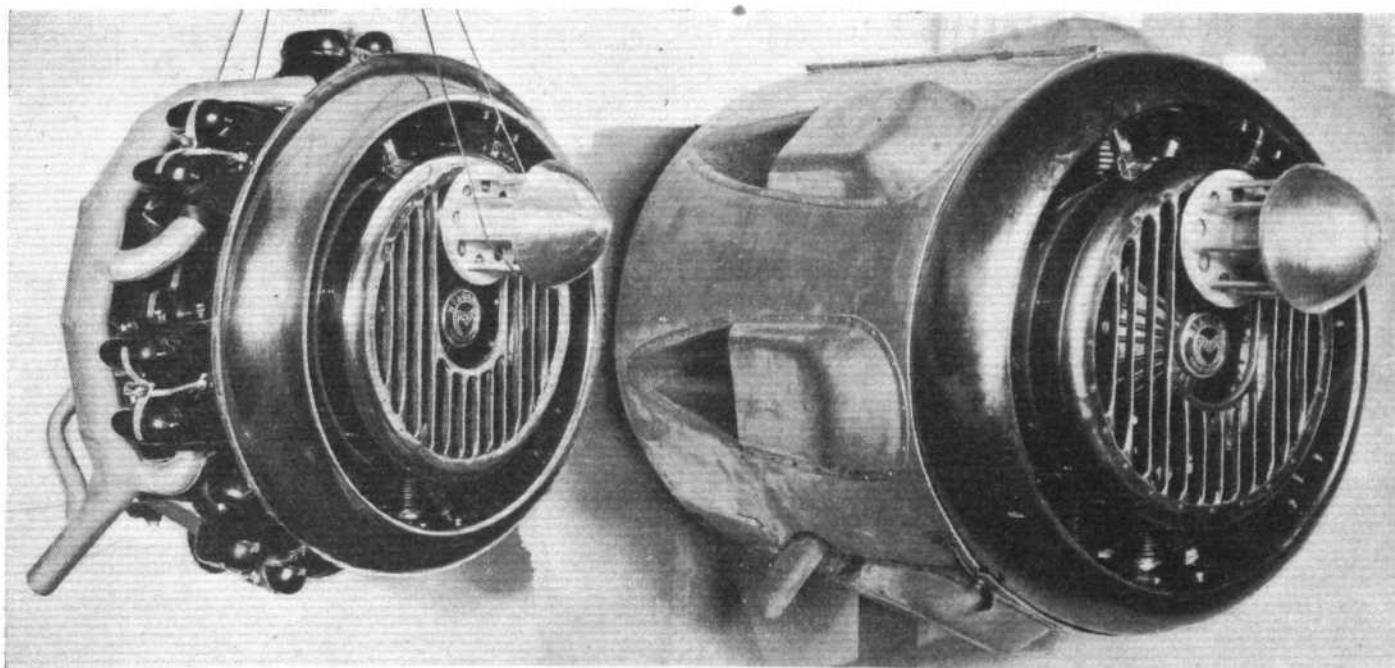
ACCESSIBILITY: The 90-h.p. "Niagara" with bonnet raised, showing how accessible are the valves and magnetos. Two rocker caps have been removed for inspection of rockers, etc.

THE 90-H.P. NIAGARA ENGINE

The unusual structural features of the engine comprise the following:—

The Cowling.—This consists of a substantial chromium-plated nose-piece supported on a tubular ring stayed rigidly from the crankcase. The rear edge of this nose-piece is threaded with leather thong to provide a non-rattling support for the bonnet. Between the cylinders are provided deflector plates supported from flat plates anchored to the tubular ring.

The tops of the finned cylinder heads are covered in by cast helmets, made detachable purely for manufacturing convenience. The gaps between the front of the helmets and the cowling ring are bridged by sheet metal extensions screwed to the heads and lined with felt to prevent rattle. All the air entering the nose-piece is thus forced to circulate over the cylinder heads or around the barrels. The passages are so shaped that airspeeds are recorded in them



THE 90-H.P. "NIAGARA": The exhaust system can be seen in the photograph on the left, while in the right-hand view the engine is shown on a dummy mounting, with bonnet in position.

higher than that of the aircraft, resulting in cylinder temperatures lower than with a naked engine. The inner grid is shaped so as to force a portion of the air behind the gear case, thereby equalising the temperatures of the upper and lower cylinders.

The exhaust collectors are situated inside the outer bonnet. To remove any possibility of fire risk, a sheet aluminium guard is provided, which completely surrounds the rear of the engine, and shields it from the exhaust pipes. This shield forms a natural extension of the cylinder head fairing; the exhaust collectors are thus sandwiched between the shield and the outer bonnet. Provision is made by suitable holes in the wall of the main air tunnel for a proportion of the cooling air to be driven over the collectors, sufficient to maintain them at safe temperatures. In a serious crash, the exhaust pipes will be trapped between two layers of cold aluminium, thereby eliminating one of the main causes of fire after crash.

The accessibility of the engine is in no wise impaired by the presence of the cowling. After lifting the bonnet, access can be gained to the sparking-plugs, the valve gear, the magnetos, the cylinder base nuts, the oil filters, the petrol pump and all other accessories without disturbing the cowling in the slightest.

Before removing a cylinder, it is necessary to detach the exhaust collector and the inter-cylinder deflectors on either side of the cylinder. The nose-piece need not be disturbed. The cylinder may then be removed, after unscrewing the four base nuts and slackening the induction-pipe nut.

The Valve Gear.—The valve gear is completely enclosed in oil-tight cast aluminium casings. Access to the tappet-adjusting gear is gained by removal of the two cast and machined rocker covers on the top of the cylinder head. They are outside the cowling, and the latter is therefore not disturbed. The covers are held in position by a V-shaped spring secured by a self-locking thumb screw.

To remove a pushrod it is unnecessary to disturb the casing surrounding it. This casing is oval in section; depression of the valve by the fingers permits the pushrod to be moved to the rear and withdrawn upwards.

The pushrods are not simply surrounded in the usual manner by tubes extending to the tappet guides. With such schemes, oil finding its way past the lower tappets eventually floods the cylinder-head casings. The "Niagara" crankcase is formed around its circumference with an oil-tight chamber enveloping the tappet guides. The triangulated pushrod casings (which are anchored to the cylinder and withdrawn with it) socket into the cover of this chamber through rubber-lined expansion joints. Oil working out of the tappet guides is trapped in this chamber and drains back into the crankcase at its lowest point. In this respect, this chamber resembles the valve chest of a side-valve motor-car engine, but wrapped around a circle.

The details of the valve gear have been designed with the express purpose of avoiding lost motion and wear. They are made of the finest and hardest materials, and manufactured with extreme accuracy. A new form of valve-attack mechanism is employed, entirely eliminating wear at this point. A partial compensation for cylinder expansion is provided by the location of the forged-steel rocker bracket at the base of the cylinder head.

Prolonged running tests indicate that valve gear wear and lost motion have been reduced in the new engine to a remarkable extent, so that the makers recommend that the valve covers need be removed for inspection not more frequently than every 125 hours.

Ignition and Starting.—Pobjoy engines have hitherto been equipped with two-spark rotating-contact-breaker magnetos which, having to rotate at $1\frac{1}{2}$ times the crankshaft speed, have been subjected to heavy duty. For the three new engines, a special four-pole stationary contact-breaker magneto has been produced. Having to run at only $\frac{1}{4}$ the speed of the crankshaft, the duty on the contact-breaker couplings and armature bearings is so greatly

THE NEW POBJOY ENGINES

Name	"Niagara"	"Cataract"	"Cascade"
Type	Geared	Geared	Ungeared
Rotation	L.H. Tract.	L.H. Tract.	R.H. Tract.
Bore	77 mm.	77 mm.	77 mm.
Stroke	87 mm.	87 mm.	87 mm.
Cubic capacity (c.c.)	2,835	2,835	2,835
Guaranteed power at normal r.p.m.	84	75	65
Normal r.p.m.	3,200	2,900	2,600
Guaranteed maximum power	90	80	70
Maximum r.p.m.	3,500	3,200	2,850
Gear reductions	0.47:1	0.47:1	—
Dry weight, including airscrew hub and cylinder deflectors, but excluding exhaust collectors and cowling	145 lb.	135 lb.	126 lb.
Weight of exhaust collectors	6 lb.	6 lb.	6 lb.
Weight of cowling	10 lb.	—	—
Maximum Power/Weight ratio (lb./h.p.)	1.61	1.71	1.80
Guaranteed fuel consumption at 0.95 throttle and less (pints/b.h.p.-hr.)	0.52	0.53	0.53
Guaranteed fuel consumption at full throttle (pints/b.h.p.-hr.)	0.60	0.60	0.60
Oil consumption (pints/hr.)	1.0	0.90	0.80
Overall diameter (in.)	26.5	26	26

Starting gear.—Cable-operated from cabin, in conjunction with trembler coil and press-button switch. A hand-starter magneto may be used in lieu of the coil if no source of current is available.

Fuel.—Any good quality "straight" petrol or petrol containing benzol or traces of T.E.L.; the octane value should not be less than 73.

Ignition.—Full dual, by 4-pole magnetos and separate distributors.

reduced as to eliminate the possibility of trouble with these components and to render them as durable as the rest of the engine.

The new magnetos are fully screened, and the "Niagara" will normally be supplied fully bonded for use with radio. Three famous makers of sparking plugs have produced new plugs specially suited to "Niagara," and flight tests show that the plugs will need inspection only once every 250 hours.

Separate distributors are fitted and include improvements which entirely eliminate the possibility of internal cracking. One distributor is fitted with a trailing segment for connection to a trembler coil or hand magneto, providing finger-tip starting in conjunction with hand-turning gear built into the engine and operated by cable from the pilot's seat. This system works perfectly from cold, and renders it entirely unnecessary ever to touch the airscrew.

Induction System.—The induction passages are cast integral with the rear portion of the crankcase, and radiate from a common centre, which is warmed by an exhaust-heated "hot-spot." Short tubes with rubber expansion joints connect the crankcase with the cylinder heads.

All the induction pipes are of the same length, ensuring an exceptional uniformity of mixture strength. As a result, the specific fuel consumption when cruising is low, the guaranteed figure being only 0.520 pints/b.h.p./hour. The mixture is enriched to 0.60 pints just at full throttle by a power jet operated by a cam on the throttle lever.

To eliminate the possibility of freezing, the new carburetter has formed in it a passage around the throttle chamber, through which is circulated the whole of the hot scavenge oil. In addition, a controllable hot-and-cold air intake is fitted, the mouths of which lie inside the space formed between the lower cylinder cowling and the bonnet. This space contains comparatively dead air, and in consequence, the likelihood when flying in dust-storms of sand being sucked into the air intake is greatly reduced.

Cylinders.—The die-cast aluminium cylinder heads are generously finned, and are screwed to the steel barrels by the makers' patent process, which has survived the test of eight years without a single leak. The valve seatings are inserted into the head by a new process which has been the subject of twelve months' continuous experiment. The new method entirely eliminates the three conditions which tend to loosen valve seats, namely: unequal expansion, erosion by hot gases, and the hammering effect of the valve impacts. The new valve seat is claimed definitely to combine the security of the integral seat with the manifold advantages of aluminium heads.

Reduction Gear.—The reduction gear is of the double-helical type, and includes a shock-absorber to eliminate chattering at low speeds. The large gear floats axially, as in previous Pobjoy engines, but the airscrew shaft drum is now made detachable and has hardened driving dogs, thus eliminating wear at this point.

Ruxiliary Drives.—The petrol pump drive is carried on the port side of the rear cover, and is automatically lubricated from the crankcase. A pair of spindles emerging to the rear and running at $\frac{1}{4}$ crankshaft speed are provided for driving the R.P.M. indicator and a mechanical windscreen wiper (if required), respectively.

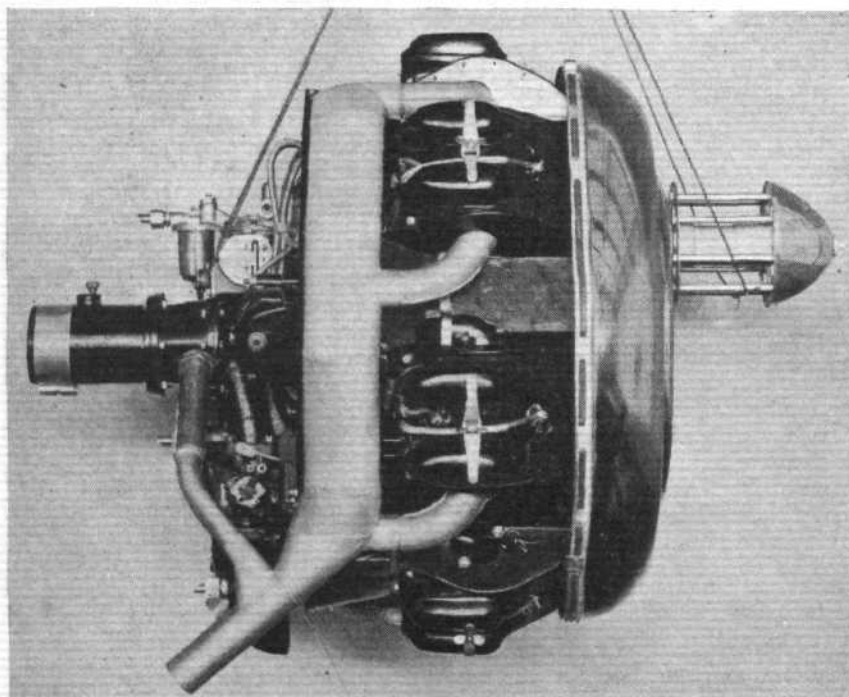
On the starboard side of the rear cover is fitted a "Veeder" type of indicator, sealed by the makers, which records the number of engine hours run, up to 1,000.

Miscellaneous Features.—The well-tried crankshaft and its bearings, the pistons, the cam-drive gear, oil-pump, etc., are retained exactly as in previous engines. These components have an unbroken record of seven years' service without a single failure.

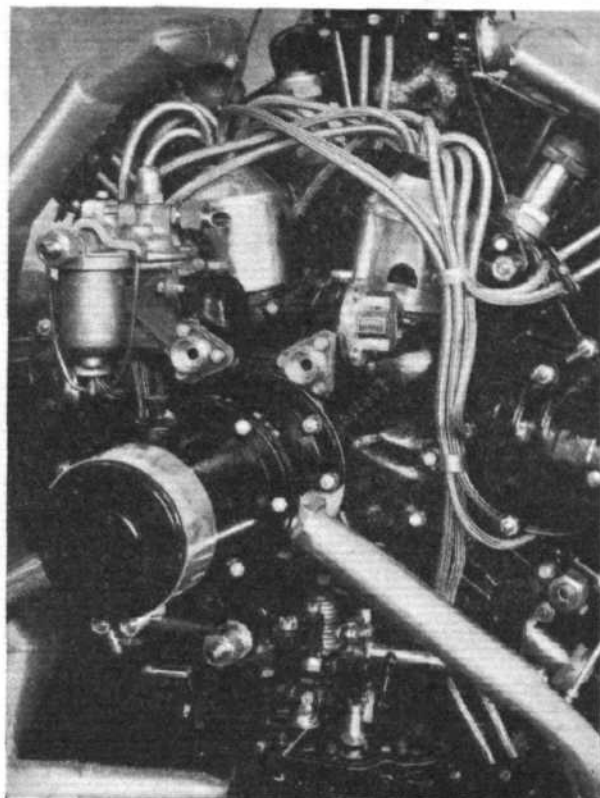
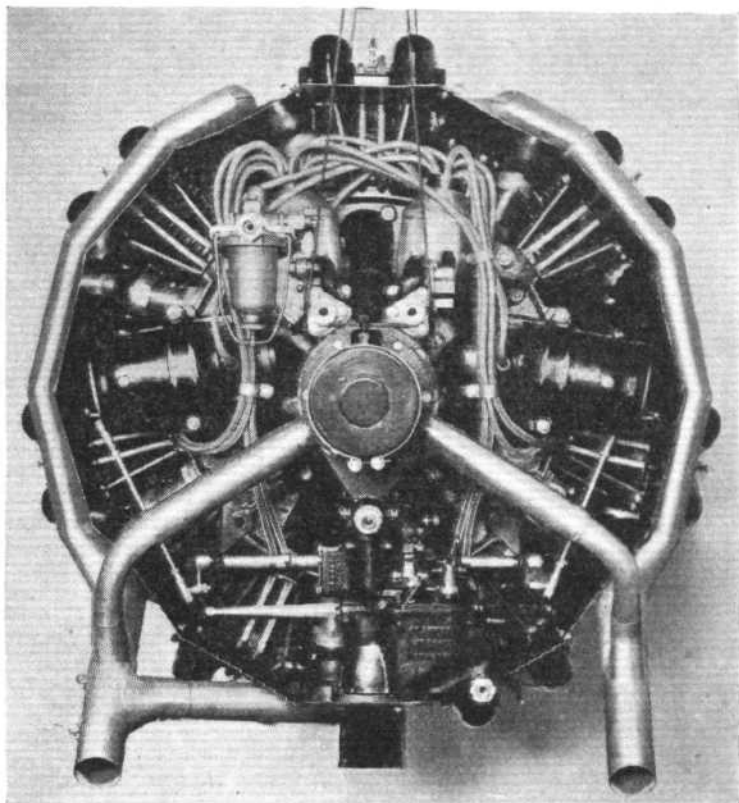
The front and rear crankcase covers are made of magnesium alloy, but the two half crankcases are as hitherto, made of heat-treated high-tensile aluminium alloy.

The exhaust collectors are of improved design, reinforced at all corners with internal fillets, and are protected against corrosion by "aluminisation."

The two oil-pump unions and the pressure gauge attachment are connected by steel pipes to union, located conveniently on the rear cover. These pipes are carried in supports permitting their free expansions. By this arrangement, the provision of the flexible pipes to the tank is greatly simplified.



SIDE VIEW OF "NIAGARA": The electric generator and the petrol pump may be seen.



REAR VIEW OF "NIAGARA" : The hand starter may be seen on the left, just below the control shaft. In the close-up view on the right can be seen the hours counter, twin tachometer drives, shielded distributors and ignition cables, petrol pump and electric generator. The three oil-pipe connections can be seen below, two on the right and the scavenge return at back of carburettor oil jacket.

A nickel chrome steel master-rod, integral with the big-end ring, is now employed instead of the two separate parts used in former engines. As before, the inside of the big-end ring is hardened, as also is the crankpin. A bronze bush floats between the two.

The centrifugal-filter-flywheel is retained, thereby assuring the continued durability of the big-end bearing and the reduction gearwheels.

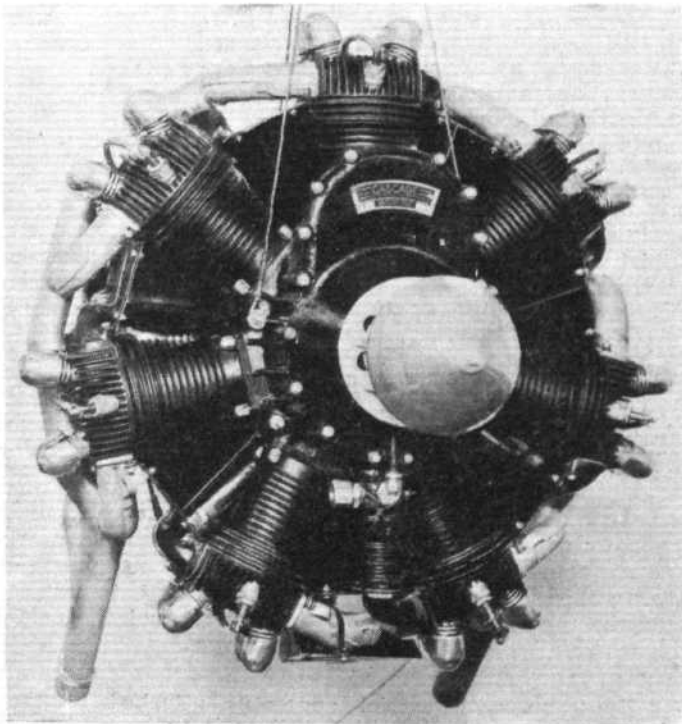
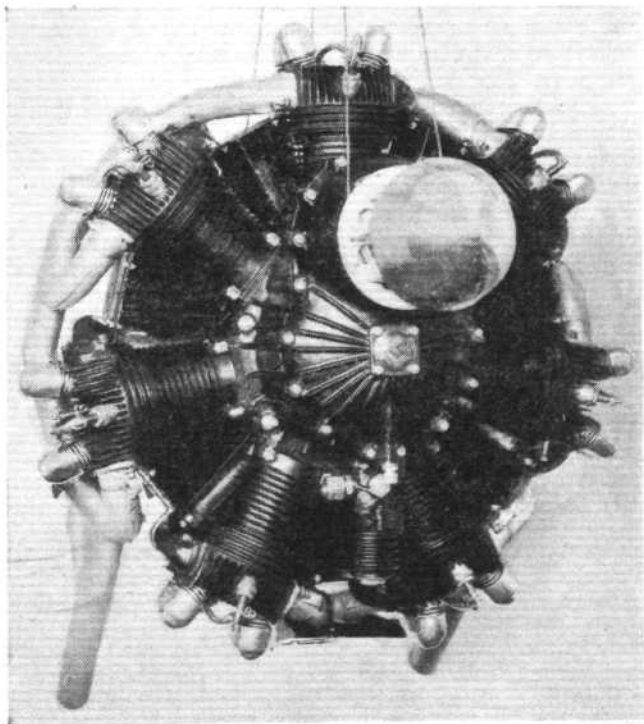
The master and articulated connecting-rods are machined from nickel-chrome steel forgings and polished all over.

A 60-watt 12-volt electric generator can be supplied mounted on the rear end of the engine, and driven through a flexible coupling from an extension of the crankshaft. Alternatively, this drive can be supplied arranged for driving Autogiro rotors.

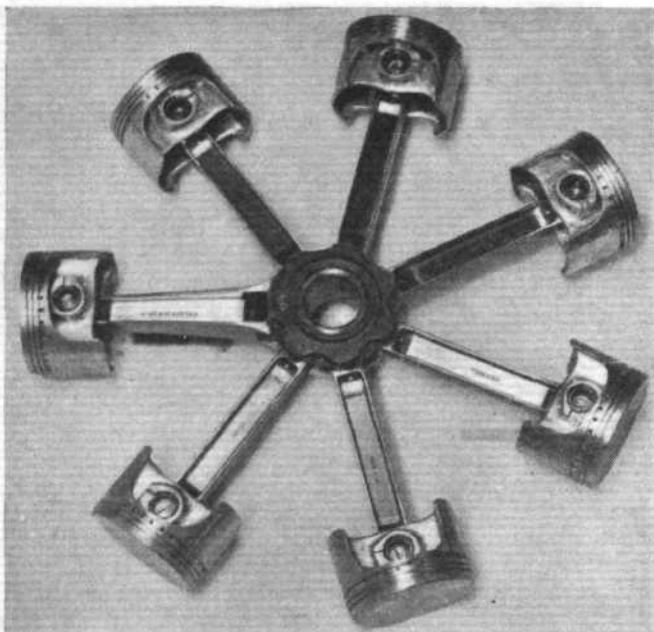
Economy.—The exceptionally low cruising consumption of 0.52 pints/b.h.p. hour has already been mentioned. This, at the usual cruising power of 70 per cent. rated horse-power, gives the remarkable figure of only 3.85 gallons per hour.

Careful design and manufacture of the cylinder barrels and the uniform cooling produced by the inter-cylinder deflectors has reduced cylinder distortion to vanishing point. As a result, the cruising consumption of oil averages only one pint per hour.

Durability and Maintenance.—The efficient design of cylinder barrel, head and valve seats enables the engine to be run at least 250 hours between top overhauls. The new valve gear requires inspection only once during that period.



THE JUNIOR MEMBERS OF THE FAMILY : The 80-h.p. "Cataract" on the left, and the direct-drive 70-h.p. "Cascade" on the right.



The interior parts of the engine are made with such a degree of accuracy and finish that complete overhaul is desirable only after 500-hour intervals. Experience with the new engine has shown that after the first 500 hours the wear is so slight that it is likely that this period may be safely increased.

Quietness and Comfort.—Due to the low tip speed of the geared airscrew, and to the smooth exhaust from seven high-speed small cylinders, the noise per horse-power of "Niagara" is very small. The almost perfect inherent balance of the seven-cylinder radial results in the practical elimination of vibration.



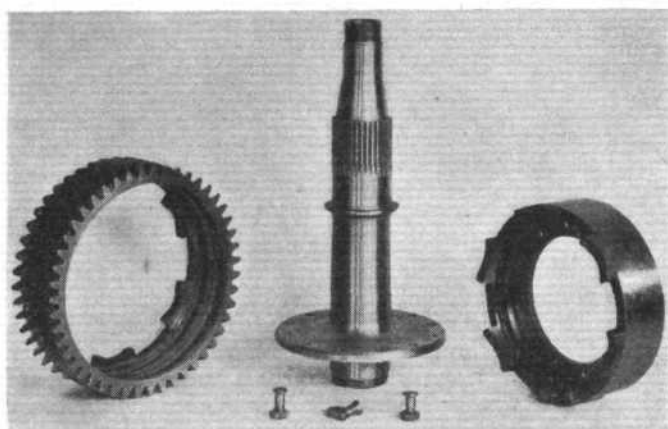
Memorandum for long-distance flights

THE Air Ministry has issued a Memorandum for pilots indulging in long-distance flights, and a few points out of it are worth putting into print in this journal.

The Air Ministry, when obtaining permission for pilots to fly over certain countries, will include in their notification to the appropriate authorities in the countries concerned the route which will be followed and the approximate time-table. Any change in the route or time must be notified by the pilot himself to those interested. Arrival and departure messages of pilots flying along regular air routes will be sent free of charge by the aeronautical services of European countries which are members of the I.C.A.N. In the following countries special arrangements are required, the brackets enclose the officials to be notified. Malta (Air Officer Commanding R.A.F. Mediterranean; Rafos Malta); Tunis and Tripoli (Officer Commanding Air Station or British Consul; Tel.: Tunis 2974; Telegram: Navirienne Tunis); Libya ("Notte," H.M. Consul, Benghazi); Lake Tchad (Fort Lamay); Egypt (High Commissioner, Cairo. Prodrome Cairo); Sudan (Governor, Wali Halfa); Uganda (Public Works Dept., Kampala); Kenya (Customs Mombasa, Customs Nairobi, Customs Kisumu); Tanganyika Territory (Director of Civil Aviation, Aviation Dar-es-Salaam); Nyasaland (Chief Transport Officer, Zomba); Northern Rhodesia (Registrar of Aircraft, Livingstone); Southern Rhodesia (Customs Salisbury or Customs Bulawayo); Union of South Africa (Secretary, Civil Aviation, Air Directorate, Roberts Heights, Pretoria. Defair, Roberts Heights); Palestine and Transjordan (A.O.C., R.A.F., Jerusalem); Iraq (Iraqi Controller of Civil Aviation); Persian Gulf (A.O.C., R.A.F., Iraq); India and Burma (Aerodrome Karachi, Grammarist Akyab, Gavenger Mirgaladon, Sub-division Victoria Point); Siam (British Consul, Bangkok); Malaya (Commissioner of Police, Johore, Bahru. Executive Engineer, Alor Star; Secretary, Civil Aviation Office, Singapore); East Indies (Aerodrome Authorities); Australia (Aviat, Melbourne); Hong Kong (Director of Air Services); Borneo (British Resident, Brunei). It is important that the registration letters of the aircraft and the name of the pilot be included in every message.

Air attack on locusts

EQUIPPED with special apparatus attached to the wings, a three-engined British airliner is to be employed in Rhodesia to spread a poison barrage before swarms of locusts as they pass over the country, in an effort to destroy them before they settle. Mechanism devised to



SOME DETAILS : Piston and connecting rod assembly on the left. On the right an airscrew shaft and reduction gear, showing the new hardened driving drum.

80-H.P. "CATARACT"

The "Cataract" has the same reduction gear as the "Niagara," but has semi-open valve-gear. The crankshaft, connecting-rods and internal gear are generally the same as those of the "Niagara."

Inter-cylinder defectors only are fitted, as this engine is intended for inexpensive uncowed installations. Hand-starting gear is provided. A petrol pump may be fitted if required.

70-H.P. "CASCADE"

The "Cascade" is a direct-drive version of the "Cataract," and aims at providing a smooth, simple and light power plant at the lowest possible price. It also has the four-pole magnetos, but hand-starting gear is supplied as an extra. A petrol pump can be fitted if required.



spread a fine curtain of sodium arsenite powder has been sent out from England to Broken Hill, where it will be fitted to the aeroplane for a series of flights in search of the deadly insect armies. Mr. R. F. Caspareuthus, who at one time held the record for the flight from England to Cape Town, is the pilot detailed by Imperial Airways for the experiment. His machine is a de Havilland "Hercules" biplane of the fleet that began the Cape air mail service and is now superseded by the faster four-engined Armstrong Whitworth "Atalanta" craft. Immediately locusts are reported the machine will be taken up to locate them; once the swarm is found the pilot will steer the machine along its front, spraying poison into the air in the hope that the locusts will fly into it. Three hundred pounds of the poison powder can be carried on the machine and, because the powder is fine enough to remain suspended in the air for some time, there is ground for hope that the swarms will largely be destroyed.

A step in the right direction

THE Belfast Corporation and the Belfast Harbour Commissioners have agreed that no pylons or wires in connection with electrical supply will be erected in the "danger zone" area of the aerodrome site on reclaimed land at Sydenham.

A children's party at Stag Lane

ON Saturday, January 20, a party of 268 boys and girls between the ages of 4 and 12—children of employees of the de Havilland Aircraft Co., Ltd., was held under the auspices of the D.H. Sports Club in the club premises at Stag Lane Aerodrome, with Mr. F. Radford acting as M.C. From 4 p.m. until 8.30 p.m. a very full programme was enjoyed by all the guests. Proceedings commenced with a jolly tea arranged by Mr. G. F. Streeter in his usual competent manner, ably assisted by 25 lady helpers convened by Mrs. A. T. Groombridge. Paper caps and favours were distributed. After tea, the D.H. Amateur Dramatic Society presented an hour of non-stop entertainment, which the children enjoyed immensely. At 7 o'clock toys and gifts were distributed to all the youngsters, and Mrs. F. T. Hearle, wife of the Managing Director, presented a fairy doll and a pedal car to the winners in the Lucky Draw. Mrs. Hearle accepted a handsome bouquet from a little girl who performed her task very daintily. Even his own family found it difficult to recognise Mr. A. T. Groombridge, Manager of the Aircraft works, disguised as Santa Claus, but one young gentleman was heard to remark to his neighbour: "It only seems a few weeks since last Christmas, doesn't it?"

From the Clubs

HANWORTH (N.F.S.)

Flying on club machines totalled 42 hours in spite of the very thick fog which was experienced on January 24 when flying was impossible. Two apprentices who have just completed their training in the workshops at Hanworth successfully obtained "A" and "C" ground engineer's licences in a recent examination. Mr. A. V. Clarke made a first solo flight, and Messrs. Walters, Kirwan, von Bahr, Back and Ramsay, who are in training for "B" licences, took night flying instruction.

Entertainment at Hanworth is of the highest order. No one can deny that. The Committee are to be congratulated upon having built up a reputation under, at times, great difficulties, for providing all the essentials for an excellent "show" at their periodical dinner-dances.

Last Saturday, January 27, over 80 persons sat down to dinner and some 30 or so came along afterwards to join in the dance; and they all enjoyed it. You didn't need a magnifying glass to find traces of a smile on the faces of those present like you usually do at dances; smiles were broad and writ large so that those who ran—or danced—could read, and there are few more infectious things than a smile. But, for a smile to be genuine it must surmount a well and pleasantly filled stomach—that which in the dictionary is politely called the principal organ for digestion. The Committee saw to it that those organs were well supplied, for the dinner was palatable, tasteful, hot, well served—in fact, unequivocally good.

Hanworth has had its difficult times and in the past people were perhaps sometimes prone to think that the standard of entertainment they would get if they attended dances there was not what they wanted; well, they would be uncommonly hard to please if they were not satisfied now. So whatever rumours may have lasted from the days before the present Committee took over can be incinerated at once. (That's only a way of saying totally destroyed.)

Even nowadays people often want to entertain their friends but have not the accommodation in their flat, nor do they wish to run to the expense of an evening in Town. For them a club like—no, why should we qualify it? let us say bluntly—for them Hanworth is just the place. Long may it remain so.

BROOKLANDS

Fog has been rather prevalent during the week, and the hours flown totalled 23 dual and 19 solo. New pupils who joined during the week were S. G. Pacey, G. Hoyle, Anderson and Kuma Madhukar; Mr. Hoyle owns his own machine. Mr. Pitt has been carrying out tests for his "A" licence. Arrangements have now been made for all prospective pupils to attend Aeronautical College lectures, which will give members taking "B" licences excellent technical training. There are now eight members waiting favourable enough weather for them to do their night-flying tests. The sales department has got an excellent stock of second-hand machines, and demonstration flights can be arranged to suit purchaser's convenience.

HATFIELD

The London Aeroplane Club flew 32 hours 50 minutes during the last week. Messrs. J. A. Lucas and C. B. Mills have passed tests for "A" licences. The Club has much pleasure in welcoming Mr. B. Oehlers from Singapore and Mr. H. Ross Kirkman from South Africa.

The flying times for the R.A.F. Reserve Flying Club totalled 8 hours 25 minutes. A luncheon was held last week at the Royal Air Force Club for the Committee of the Club to meet their President and Vice-Presidents. The following attended: Sir C. Ll. Bullock, Air Com. C. L. Courtney, Group Capt. R. Leckie, Lt. Col. F. C. Shelmerdine, Sir Harry Brittain, Vice-Presidents, Flt. Lt. R. W. Reeve, F/O.s R. E. G. Brittain, Chairman, G. F. Court, A. G. Lamplugh, C. K. Robinson, P. E. Underwood, Hon. Secretary, D. N. Grice, Hon. Treasurer, and Mr. C. M. Wight-Boycott. The guests were welcomed by F/O. R. E. G. Brittain on behalf of the Club, and a report of its activity, since its birth last spring, was submitted. Lord Trenchard replied on behalf of the guests. The original drawing, by H. H. Harris, which was printed in the *Bystander* for August 2 of last year, of the Club's Opening Display, was presented to the Club by Sir Harry Brittain. The Club has just acquired a second machine, and a third, it is hoped, will be added shortly. With the provision of civil parachutes, kindly

supplied by Capt. Lamplugh, and the existing service ones it is now possible for all members and their guests to wear parachutes during flights. The Club has also acquired the latest Williamson Pistol Camera for the use of any members who wish to practice aerial photography. Arrangements are being made to hold the Annual Flying Display on Saturday, June 16 next. The Club has flown 260 hours with its machine since last July, and the membership has now reached 106.

The weekly flying time for the Stage and Screen Aero Club amounted to 1 hour 50 minutes.

Visitors to the aerodrome included Mr. Taylor in the Shell Mex "Leopard Moth," Mr. Wilson-Fox from Ratcliffe, and Mr. Nigel Norman and Mr. Bulstrode.

THE NORFOLK AND NORWICH AERO CLUB

Instruction was given by Mr. J. Collier to Messrs. J. C. Smith, F. W. Rushmer, and R. T. W. Ketton-Cremer. Mr. A. R. Cox took some forced-landing practice and successfully passed his forced landing tests. Solo flights were made by Messrs. S. Hansel, A. J. S. Morris, A. R. Cox, A. R. Kirkby, H. C. Stringer, F. W. Rushmer, and W. O'Brien. Mr. S. Hansel and a friend took a machine away for the week-end to Broxbourne. The Club are glad to say that there was a good attendance on the first of the Visitors' nights, which was held last Thursday. Bridge tables are provided for those who wish to play. There will be another Supper Dance in the clubhouse at 8.30 p.m. on Friday, February 16; the band in attendance will be Wally Drane's "Follies" Dance Band. The Annual Dinner Dance will be held at the Arlington Rooms on Friday, March 2; Lt. Col. F. C. Shelmerdine, the Lord Mayor and the Lady Mayoress have accepted invitations. On Friday, March 23, Professor D. Atkinson will give a lecture in the clubhouse on "Archaeology," which will be illustrated with lantern slides from air photographs taken by the Club.

CINQUE PORTS FLYING CLUB

The second week's work during 1934 resulted in 23 hours 50 minutes flying being put in. The Club started the year with 21 unqualified pupils on the list, and already one of them has completed his "A" licence tests. New members are Messrs. Snead, Cox and N. Fellows, the former has an "A" licence and is taking advanced dual and navigation. The Sixth Annual Dinner and Dance will take place at the Royal Pavilion Hotel on Friday, February 2, at 7.30 p.m. Tickets, 17s. 6d. double and



A SINGER WHO FLIES: Mr. Georges Seversky, the well known singer, is also a competent pilot and a member of the Cinque Ports Flying Club. He will sing at the Club's Dinner next Friday.

10s. 6d. single, can be obtained from the secretary at Lympne. The Chester Beaty Players will supply the music, and Georges Seversky and Sandra Swenska will sing during the interval.

THE EAST ANGLIAN AERO CLUB

With the help of the unusually fine weather last week, three members were enabled to carry out first solo flights, Mr. Becker, Mr. Wilmot, a member of the London Taxi Drivers' Club, and Miss Hughes, who, although only 15 years of age, made a good first solo after only 12 hours 30 minutes dual.

LIVERPOOL AND DISTRICT AERO CLUB

The weather conditions during the week have been good, and the flying times totalled 19 hours 25 minutes dual and 20 hours 40 minutes solo.

KENT FLYING CLUB

Flying time for the week ending January 29 totalled 9 hours, cross-country flights being made to Lympne and Hanworth. New members are Messrs. Noble and Issaverdens.

NORTHAMPTONSHIRE AERO CLUB

Flying has been much interrupted by fog during the last week, only 10 hours 20 minutes having been flown. On Thursday, when fog was almost universal, Sywell aerodrome was clear. A dog fox was seen basking in the sun on the aerodrome one day during the week; he took no notice of a machine taking off over his head.

CARDIFF AEROPLANE CLUB

During the week ending Sunday, January 21, 4 hr. 5 min. dual, 3 hr. 5 min. solo and 30 min. tests have been flown. One "A" licence has been gained, by Mr. G. E. Watkiss. Flying for the week ending January 28 included 1 hr. 40 min. dual, 6 hr. 15 min. solo, and 40 min. tests. Mr. G. Owen Rees made a first solo.

READING AERO CLUB

(With which is incorporated the Berks, Bucks and Oxon Aero Club). (What a mouthful; why not Readoxon or Berbuxon.—Ed.)

An efficiency competition for which a challenge cup has been presented by Mr. W. J. Barnes, has been arranged by the Club. This competition, the rules for which are appended, has been designed to improve the breed of club "A" licence pilots. It is confined to genuine *ab initio* "A" licence pilots and members of the Club, and the winner will be the member who in the opinion of the chief instructor has been most proficient in the handling of an aeroplane during the period of the competition. Of the tests enumerated, A, B and C must be completed by May 31 next, D, E and F by June 30, G, H, I and J by July 31 and K and L and an oral test by August 31. Entrance for the competition closes on April 15 next.

THE "W. J. BARNES" CHALLENGE CUP RULES.

1. Competitors must be Members of the Reading Aero Club, and in possession of a current "A" Licence.
2. Service, Ex-Service, Members, and holders of a "B" Licence are ineligible to compete.
3. **Flying and Practical Tests.**
 - A. Starting up engine. B. Taxying, and handling of engine. C. Take off and Climb.
 - D. Action in the event of engine failure during the take off. E. Turns, medium and steep, with engine, the turn to be sustained for a full 360 degrees. F. Ditto without engine.
 - G. Side slipping, left and right. H. Spins, left and right, one complete turn, competitor to come out facing exact direction as at stall. I. Forced landing test from 2,000 ft. away from the Aerodrome. J. Approach and landing on aerodrome.

GENERAL COUNCIL

OF

ASSOCIATED LIGHT AEROPLANE CLUBS

A meeting was held at the Royal Aero Club, 119, Piccadilly, London, W.1, on January 24. Those present were:—

Colonel Sir Joseph Reed in the Chair. Royal Aero Club: W. Lindsay Everard, M.P., Major A. Goodfellow; Brooklands Aero Club: A. P. Bradley, R. J. Bush, Captain H. Duncan Davies; Bristol and Wessex Aeroplane Club: A. H. Downes Shaw, Captain L. P. Winters; Hampshire Aeroplane Club: W. L. Gordon; Household Brigade Flying Club: R. L. Preston; Lancashire Aero Club: J. C. Sellars; Leicestershire Aero Club: S. Brown, R. C. Winn; Liverpool and District Aero Club: D. Warner Bond, W. H. Varley; London Aeroplane Club: Captain A. G. Lamplugh, H. E. Perrin; Midland Aero Club: Major G. Dennison; Newcastle-on-Tyne Aero Club: Col. Sir Joseph Reed; Southern Aero Club: C. Titterton; Cardiff Aeroplane Club: Captain W. R. Bailey; York County Aviation Club: H. R. Humphries. In attendance, H. E. Perrin, General Secretary.

Election of Vice-Chairman.—Colonel Sir Joseph Reed (Newcastle-on-Tyne Aero Club) was unanimously re-elected Vice-Chairman of the General Council for 1934.

Election to the General Council.—The following Clubs were elected to the General Council: Cardiff Aeroplane Club, Reading Aero Club.

Royal Air Force Assistance at Civil Aviation Meetings.—The General Council considered a communication from the Air Council, dated December 16,

K. Cross country over course, Woodley, Newbury, Basingstoke, Woodley. (All the above tests to be done with the Chief Instructor.)

L. Solo landing from 2,000 ft. into Aerodrome circle, engine not to be used after throttle being closed.

4. Oral Tests.

A. Inspection before flight, opening and folding, inspection of points after heavy landing, elementary air navigation rules. B. Action after forced landing, picketing on ground, etc. C. Action in case of fire in the air.

Despite the fog and general bad weather the amount of club flying has been maintained very satisfactorily. Last Sunday four school machines and four privately-owned aeroplanes were in the air most of the time. The Service Department is now housed at the eastern end of the aerodrome together with privately-owned machines and is under the supervision of Mr. R. C. Warren. The old service hangars now being given over to the housing of school machines and to the Overhaul Department. Deliveries of the Miles "Hawk" are continuing while two machines have been shipped to India during the past month.

THE LANCASHIRE AERO CLUB

The longer evenings have already affected flying times, which are considerably improved. During the week ending January 21, Mr. A. F. Gotch, the flying house-master from Bedales Co-ed School, went through an entire course of inverted flying in its different forms and has returned south, no doubt to put ideas of inverted education into practice. Messrs. Holden and McKenzie, the inseparable representatives of Messrs. A. V. Roe & Co. (more usually known as MacHolden and Holenzie), made their first solo flights within an hour of each other, thereby cancelling out many side bets. Mr. G. P. Moss, who has been studying at the Club, has taken his "B" licence. Visitors to Woodford included Mr. Tranum and F/O. Franklyn, home on leave from Iraq.

THE HERTS AND ESSEX AEROPLANE CLUB

Fog last week has hampered what otherwise might have been a good week of flying for this time of the year; nevertheless, 34 hr. were flown. The following new members have joined the Club:—Messrs. Pearce, Gray, Faithful and Mumford, and quite a respectable number of inquiries from prospective Club members have been received through the post and on the telephone; this inquiry list would seem to augur well for a busy spring.

The postponed monthly (January) competition was held on January 28. "A" Club pilots were eligible and flying members with less than 20 hr. solo to their credit were eligible as observer-navigators. One minute before departure time the observer was handed a map and told to locate certain marked points some 15 miles or more distant from each other and the pilot steered a course accordingly. All points were observed by marshals on the ground and flour bombs were dropped on location. The engine was shut off at 2,000 ft. over the circle and points were awarded for good approach and landing. The practicality of this method of instruction in navigation manifested itself in the "neck and neck" between the aggregate percentages of competitors, and considering that some of the observer-navigators had never before read a map from the air they did very well indeed. The result was as follows:—1st, Pilot—W. Dack; Navigator—Gordon Chapman; 95 per cent. 2nd, Pilot—E. C. Gay; Navigator—S. A. Perrin; 88 per cent.

The cup was provisionally awarded to the winners and will be officially awarded at the annual Club Dinner.

Attention is called to the Club's Annual Dinner and Dance to be held at the Wharnclyffe Rooms, Great Central Hotel, London, on February 22. Any friends who would care to come to the dinner will be warmly welcomed. Tickets (double) 30s.; (single) 17s. 6d.

setting out the conditions under which the assistance by the Royal Air Force at Civil Flying Meetings in 1934 could be rendered.

It was unanimously agreed to recommend Royal Air Force assistance being given at the following meetings:—

June 2.—Brooklands Aero Club, Annual Air Display (minor scale).

June 23.—Lancashire Aero Club, Woodford (minor scale).

July 7.—Leicestershire Aero Club, Official Opening of the Leicester Municipal Aerodrome (major scale).

Air League Proposals for an Empire Air Day.—The General Council considered the proposals of the Air League to organise an Empire Air Day on May 24, 1934. Air-Commodore J. A. Chamier, Secretary-General of the Air League, was called into the meeting and gave a brief outline of the proposals of the Air League. Having given careful consideration to these proposals, it was unanimously decided to approve the scheme in principle and to recommend that all the Clubs, who were in a position to do so, should support the efforts of the Air League on the lines indicated in the proposals.

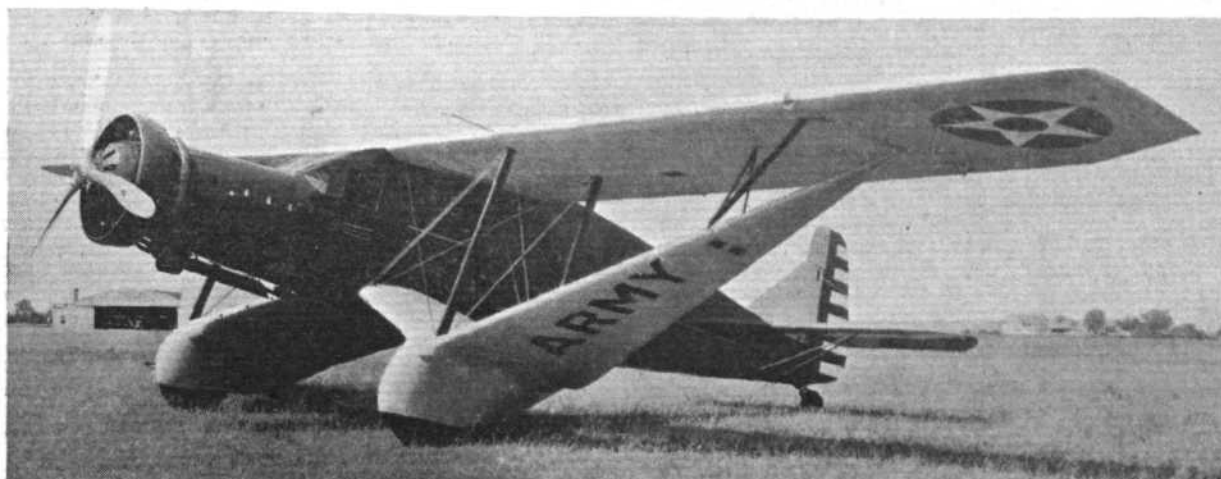
Election of Members on the Racing Committee of the Royal Aero Club.—The following Members were unanimously re-elected:—Mr. R. Ashley Hall (Bristol and Wessex Aeroplane Club); Fl.-Lt. D. W. F. Bonham Carter (Royal Aircraft Establishment Aero Club); Major A. Goodfellow (Lancashire Aero Club).

Sunday Flying.—The General Council considered a communication from the Gorell Committee on the question of Sunday flying and a Sub-Committee was appointed to give evidence on behalf of the Associated Light Aeroplane Clubs.

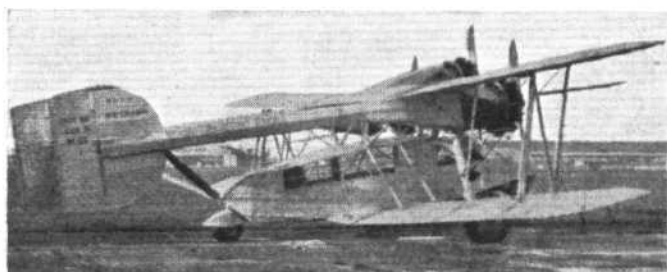
Sub-Committee: A. H. Downes Shaw (Bristol and Wessex Aeroplane Club), Major A. Goodfellow (Lancashire Aero Club), H. Duncan Davies (Brooklands Aero Club).

Fixtures, 1934.—The fixtures for 1934 were approved.

NEW AIRCRAFT



ECONOMICAL TRANSPORT: A Bellanca C-27A transport, one of a batch of 14 machines of this type supplied to the U.S. Army Air Corps for general transport work. A Pratt & Whitney geared "Hornet" of 675 h.p. is fitted. Nearly every section of the aircraft facing into the slipstream has some lift value, and it is reported that the machine is remarkably steady when flying in turbulent air. A payload of 3,000 lb. may be carried. The C-27A is generally similar to the well-known "Aircruiser."



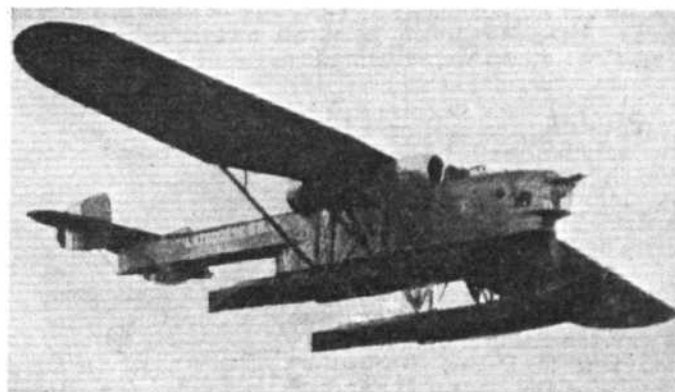
AN UNORTHODOX FRENCH COLONIAL MACHINE

MOST of the French "Colonial" aircraft which have been built during the past three or four years have been high-wing monoplanes. An interesting aircraft designed for reconnaissance, wireless work, photography, bombing, troop carrying and ambulance work under colonial conditions has been produced by the French Société des Avions C. T. Weymann. The general design may be seen in the photograph. Known as the type 66, Col. 3, the aircraft is an equal-span biplane with a cabin of very small ground clearance. The wings are of conventional two-spar design constructed of metal and covered with fabric. The upper plane is in three sections, while the lower plane is in two. Welded steel tubular construction is used for the fuselage with fabric covering. Besides the normal wheels of the split type undercarriage, a third wheel is accommodated in the nose. Messier oleo legs of long travel are used, and wheel brakes and a tail wheel complete an undercarriage well suited for operation from bad country. The pilots' cockpit is in the nose and is provided with two seats and dual controls. Behind this compartment is the navigation equipment and wireless to the rear of which is the bomber's position. The arrangement of the *empennage*, the main members of which are of steel tubing covered with fabric, may be seen in the photograph. The elevator is located between the two large transverse members and is closed in at each end by a rudder. Three Lorraine "Algol" engines of 300 h.p. are fitted, the central engine being mounted level with the top plane,

while the outboard engines are slung under the wing. The airscrew arcs overlap.

THE LATECOERE 550 BOMBER SEAPLANE

PERHAPS the large twin-float seaplane bomber type is more popular in France than in any other nation. The latest addition to an already large range of aircraft of this type is the Latécoère 550. The machine is a high-wing monoplane with all-metal fuselage and floats using a wing with wooden ribs and fabric covering. The engines are four Gnôme-Rhône "Mistral" Type 9 Krsd of 500 h.p., arranged in tandem pairs on each side of the fuselage immediately below the wing. Low-drag cowlings and Gnôme-Rhône two-bladed metal airscrews which are adjustable on the ground are fitted. The pilots' cockpit, which is immediately forward of the leading edge of the wing, is provided with dual controls and two-way wireless with D/F equipment. Three gunners' positions are provided. The crew consists of one officer, one pilot, one wireless operator and three gunners.



THE WEYMAN 66, COL. 3

Span ..	50 ft. 4 in.
Length ..	36 ft. 7 in.
Wing area ..	688 sq. ft.
Power ..	900 h.p.
Weight, empty ..	7,700 lb.
Gross weight in flying order ..	11,000 lb.
Power loading ..	12.2 lb./h.p.
Wing loading ..	16 lb./sq. ft.
Top speed ..	149 m.p.h.
Cruising speed ..	124 m.p.h.
Ceiling ..	18,000 ft.
Ceiling (on two engines) ..	11,500 ft.
Range ..	620 miles.

THE LATECOERE 550

Wing area ..	1,400 sq. ft.
Useful load ..	9,020 lb.
Bomb load ..	3,300 lb.
Gross weight ..	21,800 lb.
Power output (ground level) ..	2,000 h.p.
Wing loading ..	15.6 lb./sq. ft.
Power loading ..	10.9 lb./h.p.
ESTIMATED PERFORMANCE:	
Top speed (ground level) ..	156.8 m.p.h.
Top speed at 13,100 ft. ..	141 m.p.h.
Cruising speed at 13,100 ft. ..	118 m.p.h.
Climb to 13,100 ft. ..	16 min. 15 sec.
Climb to 16,400 ft. ..	26 min. 21 sec.
Service ceiling ..	23,300 ft.
Take-off ..	18 sec.
Landing speed ..	59 m.p.h.
Range ..	620 miles.

Airisms from the Four Winds

Memorial to Hinkler

A SUBSCRIPTION has been opened at Bundaberg for the purpose of raising funds for the erection of a memorial to Sqd. Ldr. Bert Hinkler. The inhabitants of Bundaberg itself think the memorial should be erected in their town, Hinkler's original home, but it has also been suggested that Brisbane or even Canberra would be a more fitting place. The High Commissioner for Australia, Mr. S. M. Bruce, on Monday, January 29, presented to Signor Grandi, the Italian Ambassador, an inkstand, mounted on Tasmanian Blackwood. This inkstand will be sent to the Prefect of Arezzo as a gift of the Commonwealth Government in recognition of the sympathy and kindness of the people of Italy.

Lord Londonderry's air tour

THE MARQUIS OF LONDONDERRY, the Secretary of State for Air, arrived at Karachi from Quetta on Tuesday, January 23, and left for England a few days later. During the afternoon of Monday, January 29, he arrived in Rome intending to have a meeting with Signor Mussolini, who is now head of the Italian Air Ministry, among his other duties, before leaving for home. Incidentally it is interesting to note that both Col. Sheldermine and Mr. Lloyd-Taylor, of Imperial Airways, are also in Rome.

Arctic explorers

MR. LINCOLN ELLSWORTH, the airman explorer, has returned to New Zealand, having failed in his intention to reach the South Pole. He had with him an aeroplane, but owing to the crumbling of the ice he was unable to get it off the water. The other expedition under Admiral Byrd is reported to be in a dangerous position. Fears are expressed for the safety of forty-three members, who are reported to be marooned in a temporary camp which is threatened by moving ice. Four other members, at Little America, the chief base of the expedition, are also cut off from their comrades. Meanwhile the flagship of Admiral Byrd is drifting among the ice-floes unable to berth.

Mlle. Maryse Hilz crashes

Mlle. MARYSE HILZ, the French woman pilot, who left Villacoublay on Friday, January 26, for a flight to Tokyo, has crashed at Alexandretta. Mlle. Hilz and her mechanic are unhurt, but the machine is badly damaged. The airwoman had left Athens on Monday morning for Aleppo.

The Rome-Buenos Aires mail flight

THE Savoia-Marchetti S.71 triple-engined monoplane, in which Signori Francesco Lombardi and Branco Mazzotti and three others were attempting an experimental mail-carrying flight from Rome to Buenos Aires in three days, crashed on a beach twelve miles south of Fort Aleza, Brazil, after having made a fine Atlantic crossing in fourteen hours. The machine, which was carrying 200 lb. of mail and copies of a souvenir edition of a newspaper, left Montecelio aerodrome between Rome and Tivoli at 6 a.m. on Saturday, January 27, and flew to Dakar, Senegal, by way of Casablanca, Agadir and Thies. After leaving Dakar the aircraft was in wireless contact with the S.S. *Westfalen*, which is stationed in the South Atlantic as a catapult ship, and at 8.10 p.m. G.M.T. on Sunday the occupants wirelessly that all was well and that they were 40 miles from the island of Fernando de Noronha off the Brazilian coast. Faint signals were picked up at 2.30 p.m., but the position of the machine was not given. The Italian Air Department at Rome states that wireless reports did not reach the machine, which encountered unfavourable weather

on the last stage of the Atlantic crossing. An inquiry into the reason for this failure is to be held immediately. The monoplane attempted to make a landing, through lack of fuel, on a narrow strip of beach, but struck a rock and overturned. The wrecked machine was sighted by Capt. Sours, a pilot of Pan-American Airways, who left Fort Aleza early on Monday morning. The machine was upside down near the water's edge. A member of the crew signalled to Capt. Sours with Verey lights, and the American machine circled round the Savoia to ascertain the extent of the damage. Three men were standing by the wreck. A message, written in English, Portuguese and French, was dropped by Capt. Sours advising the Italians that a wireless message was being sent to Fort Aleza requesting immediate aid. Capt. Sours' message was acknowledged by the Italians. Immediately he received the wireless message from Capt. Sours, the manager of Pan-American Airways at Fort Aleza headed a rescue party of several men, who brought the crew of the Italian machine to Fort Aleza, where two of them who had received injuries are receiving attention.

From Algiers to Lake Chad in a "Dragon"

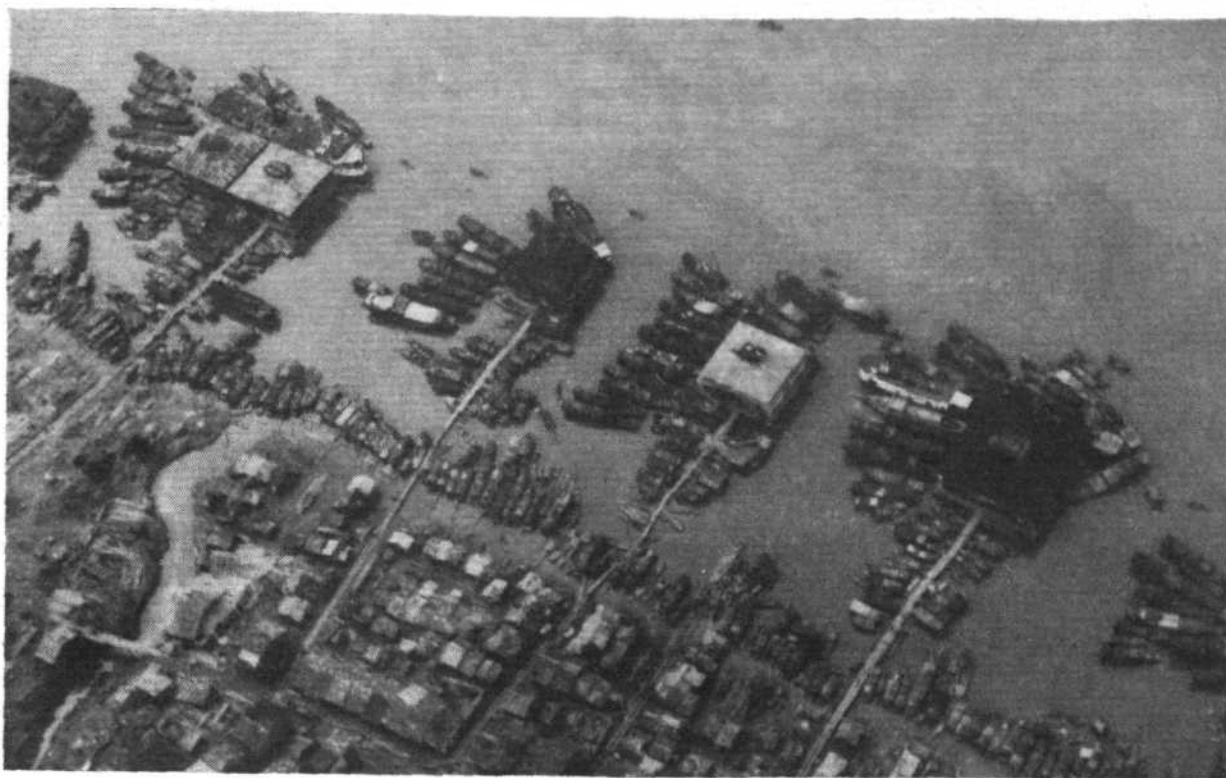
THREE Frenchmen, M. Robert Germain, M. Descamps and M. Pierre Laveaux, recently made, in a D.H. "Dragon," the first flight from Algiers to Lake Chad. The route chosen involved the crossing of mountains and trackless desert, and although several machines have attempted the flight, none has succeeded. The party started from Algiers and flew in one "hop" across the Atlas range to El Goléa, thence by way of Tamanrasset, Inguezan and Agades to Lake Chad. Telephoning from Fort Archambault in the Ubangi-Shari country, M. Descamps said that neither the "Dragon" nor its "Gipsy Major" engines had given any trouble. France is obviously impressed by the "Dragon," and it is likely that more than one French constructor will produce a machine in the same class to meet a demand which apparently exists in France.

Monospar Development

ONE of the latest "Monospar" (two Pobjoy) four-seaters with retractable undercarriage has been delivered to Mr. Geoffrey Ambler at Yeadon Aerodrome, in Yorkshire. A machine of the same type, but without retractable undercarriage, which was purchased by Capt. Robbin Cazalet, and has been in use for some considerable time, is now back in the shops at Croydon having the retractable undercarriage fitted. As already announced in *FLIGHT*, a wing of the "Monospar" type was built by the General



THE ITALIAN ATLANTIC FLIGHT: The four Italian airmen who left Rome for Buenos Aires on January 27. From left to right, Battaglia, Mazzotti (2nd pilot), Francis Lombardi (chief pilot), and Giuliani.



A CHINESE PUZZLE : An aerial view of the Bund at Wuchow.

Aircraft Co. recently. This was supplied to the Italian Government, has now passed its static tests, and is in the Caproni works at Milan being fitted to a Caproni 97. The wing, which has been made by Saunders-Roe, Ltd., under "Monospar" patents for a "Cloud" amphibian, has also finished the Air Ministry static tests and is being covered. It is hoped that the "Cloud" will be flying during the next month.

Caudrons for 1934

THE 1933 "Coupe Deutsche" Caudron racer is being developed into a two-seater "Grand-Sport" monoplane. Three of the new type aircraft are being built for the 1934 Coupe Deutsche contest. Two light three-seater aircraft have been designed to take part in the European Rundflug. Another new type is a twin-engined transport machine carrying six passengers and a pilot. When fitted with Renault engines driving variable-pitch airscrews, a cruising speed of 140 m.p.h. should be obtained. A retractable undercarriage will be fitted.

German gliders for South America

WHEN the s.s. *Monte Paascal* left Germany for South America early last month, she carried an expedition which will demonstrate gliders at Rio de Janeiro, Sao Paulo, and Natal. A selection of some of the finest German gliders are being taken, together with a Messerschmitt M-23 for towing work. It is understood that the aim of the expedition is to demonstrate the possibilities of gliding and soaring under tropical conditions and to make meteorological studies for the benefit of air transport.

The French Industry

WE have frequently spoken of the "grouping" of the French aircraft firms as planned by M. Pierre Cot, the French Air Minister. It now seems that the French Government is planning to scatter the factories of aircraft constructors throughout the country. Most of the big French aircraft works are near Paris. It is desirable in the interests of national security to have, as far as possible, all the large factories situated south of the Loire. The new plan concerns the manufacturers of both aircraft and engines, and to pave the way for this big change, a definite percentage, varying between 2 and 10 per cent., will be deducted from all Government orders, for the establishment of a special reserve.

The Breguet demonstration

THE Breguet 41-3 twin-engined "multiplace de combat" aircraft, piloted by Costes, has completed its demonstration in Central Europe. The machine flew back to Paris via Athens, Salonica, Istanbul and Belgrade. Calls were not made at Prague and Warsaw as originally proposed.

"Hawk" for Baghdad

THE Miles "Hawk," which was ordered by Mrs. MacDonald, has been flown out to Baghdad by F/O. H. R. A. Edwards. The machine is reported to have had an average ground speed of 95 m.p.h., and a petrol consumption of 5 gall. an hour. During the 47 hr. flying between this country and Iraq neither the engine nor airframe caused any trouble, although a certain amount of bad weather was experienced and landings made at some bad aerodromes.

"Some" span loading

IN our brief notes last week on the Short R.24/31 flying boat it was stated that the wing span is 60 ft. This figure was supplied to us in error by the makers. The actual span is 90 ft. Readers may have marvelled at a span loading of about 312 lb. per foot of span. The actual figure is about 210 lb. per foot.

New Horley syndicate

AIRPORTS, LTD., is the name to which the recently-formed Horley Syndicate will shortly be changed. Mr. Morris Jackaman will remain the chairman and Mr. Marcel Desoutter is the business manager. This company, as we have already announced, has been formed to control airports, and has started with those of Gravesend and Gatwick. The latter is now being enlarged, and full night-lighting equipment is being installed. After June 1 there will be no further instruction given there.

Joyriding

AVIATION DEVELOPMENTS, LTD., is a company recently formed to run a joyriding company on somewhat novel lines. We are not yet at liberty to divulge the method by which they hope to make a success of their undertaking, but their plans have sufficient originality to give them a sound chance of doing so. Mr. Howard Flanders, Mr. W. B. Grieve, Mr. E. A. Starling and Mr. R. D. Gerrans will be associated in the venture.

Improved wooden airscrews

THE Airscrew Co., Ltd., of Weybridge, informs us that the word "hood" used in FLIGHT for January 18 to describe the company's acquisition from the Schwarz Propellerwerke, of Berlin, is scarcely correct. Actually, the company has obtained the sole licence for the Schwarz patent finish and patent sheath, of which we hope to publish a full description in the near future.

Royal Warrant for Vacuum Oil Company

THE Vacuum Oil Company have received official notification from the Keeper of the Privy Purse that they have been awarded the Royal Warrant as purveyors of oil and grease to His Majesty the King.

Airport News

CROYDON

LAST Tuesday the Canadian and American ice hockey teams reached London from Paris in two specially chartered Air-France machines. They returned in the same manner on Friday.

A rumour has reached me that Man Mohan Singh is undefeated by his recent mishap and is to have another machine for a similar attempt on the London-Capetown record. It is said that the machine is to be the same type as the last one.

Some stir was created at the airport on Monday, January 29, when Commandant Mary Allen and Inspector Taggart, of the Women's Auxiliary Force, left for Berlin by the D.L.H. 10 a.m. service, in order, it is averred, to interview Herr Hitler on questions relating to the status of women in the world at large and in Germany in particular. The ladies left Croydon in full uniform, including field boots, military-style caps and (one) a monocle. Knowing Herr Hitler's ideas about women, the hearth, home and all that, the interview should be an interesting one.

There is now a "Loch Ness monster" at Croydon. The Imperial Airways' covered gangway for passengers has undergone considerable improvement and alteration since it was first brought into use, and has now a sort of neck and hood combined, which gives it a weird appearance when detached from the cabin doorway. Recently on the tarmac a foreman was heard to remark: "George, return the monster to the Loch," whereupon it was solemnly trundled away to the hangar.

Surrey Flying Services, Ltd., is one of the oldest companies at Croydon. Little is heard of the activities of this pioneer company, and it is therefore gratifying to know that a steady increase in its many air activities took place during 1933. Total flying hours were 2,129 hr. 38 min., an increase of just over 50 per cent. on the hours for 1932. Instruction showed a 34 per cent. increase and special charter an increase of as much as 100 per cent. In 1933 over 10,000 joyride passengers were carried without accident. Total mileage for last year was 184,325 miles. These figures do not include the flying of pupils and ex-pupils with their own aircraft. In one recent case of figures announced a single calculation showed that all the club's aeroplanes were in the air for 18 hours or so each day. As Ripley might say "Believe it or not."

Most people know that Mr. Roy Tucket is leaving Croydon shortly for Australia, with a view to making a cinema-camera record of the MacRobertson Trophy course. His "Puss Moth" has been thoroughly overhauled by Surrey Flying Services at Croydon, and several useful refinements have been made.

I am happy to say that full passenger, baggage and freight facilities have now been granted at Gravesend for outward clearance as well as inward flights. Once the ball was set rolling the Directorate of Civil Aviation did remarkably fine and quick work in persuading a doubting Customs House of the vital necessity of these facilities at what is now Croydon's emergency port of refuge for bad weather on the northern lines.

On February 4 there is to be a football match between Imperial Airways, Ltd., and a team known as "Odds and Ends." The latter contains Air-France and K.L.M. people, "Met." officials, and officials of the Croydon Air Ministry staff. In goal will be Mr. Dupe, Junior, who, it is hoped, will defend that port as stoutly as his parent has ever defended the port of Lympne. For Imperial Airways there will turn out the veteran Mr. Little, a former Crystal Palace professional, and a Surrey County player, Mr. Morton.

Travelling north the other night I was condemned to an outrageously cold railway carriage and noticed that everyone was muffled in overcoats and furs. The dining-car attendant seemed to find nothing unusual or even very regrettable about the Arctic conditions and, being an opportunist, informed me that it was much warmer in the dining car. On my return I made some inquiries at Croydon, and found that Imperial Airways passengers made no complaint even in the bitterest weather. The K.L.M. people informed me that they had had numerous complaints of their

heating system—which was too warm. They had therefore installed cabin thermometers and instructed a member of the crew to see that the cabin never reached an unduly warm temperature. It is easier to warm a train than an aeroplane, and incidentally more and more people one meets compare the attention paid to their comfort in the air very favourably with the attention (or lack of it) they get when travelling on the surface.

A. VIATOR.

HESTON

ON Friday, January 19, Mr. Nigel Norman, Chairman of Airwork, Ltd., read a paper entitled "London Air Terminal" before the London Society (see FLIGHT, page 87). Looking some years ahead of the present requirements, he quoted 2,000 yards as the minimum practical runway for a "super-terminal airport" of the future.

A 100 per cent. increase in school flying over January, 1932, shows that the intervals when the fog lifted or the gale dropped have been well filled.

On January 19 aeroplanes went to Southampton from Birkett Air Service and from Airwork on Press charters in connection with the docking of the *Majestic*. The Airwork machine, with a cinematographer on board, was piloted by Capt. G. W. Ferguson, who afterwards proceeded to the municipal aerodrome at Eastleigh, where H.R.H. the Prince of Wales and Prince George were expected to land, prior to the latter's embarkation on the *Carnarvon Casile*. On landing, pilot and photographer were told that the Princes were after all coming by train, and that all photographers had gone to meet them at the docks, but the former espied, in an unexpected corner of the aerodrome, a fine-looking car which turned out to be the Prince's, made a rapid calculation and estimated that if they did arrive by air they would do so very shortly. Accordingly, the Airwork machine took off again with the camera man on board, and had patrolled the neighbourhood for a short time when the Prince of Wales' *Vivara* came into view. Good pictures were obtained of the machine circling to land, with the town and Southampton Water in the background, and Capt. Ferguson landed in time for the photographer to take a shot of the Princes alighting.

Mr. Al. Harris, who has already made about 100 parachute descents, made a practice delayed drop at Heston on January 20, using an Irvin Air Chute instead of the Russell Lobe with which he has previously made his descents. He jumped from the Household Brigade Flying Club's "Moth," flown by Capt. Baker, at about 1,800 ft., and fell 800 ft. before pulling the string. The parachute was lent by Brian Lewis & Co., Ltd., of Heston, who are the sole agents for the Irvin Air Chute.

The floor of the club-house entrance hall is "up," but the visitor entering will sniff unsuccessfully for drains, gas, or a trapped rodent. The disturbance is, on the contrary, in preparation for the laying down of a parquet floor which will add to the warmth and comfort of this general rendezvous of Heston visitors and staff.

DEVELOPMENTS AT GRAVESEND

NOW that the controlling interest in Gravesend Aviation, Ltd., has been acquired by Airports, Ltd., even more rapid developments than hitherto may be expected at Gravesend aerodrome, and we expect to see full night flying facilities provided soon.

Mr. Morris Jackaman will be the chairman of the company, Mr. H. Gooding will remain managing director, Flt. Lt. P. H. Smith the chief instructor, and Mr. M. Spencer the secretary, a team which should ensure the success of this somewhat unique aerodrome. We say unique because there can be few landing places for aeroplanes in this country so free from fog. For example, last Wednesday, January 24, was the first day since the beginning of

January, 1933, on which it was quite impossible to get an aeroplane in to land before 2 p.m. After that, it is true, the weather was fine and one of the firm's *ab initio* pilots was actually sent up, while most of the rest of the country was shrouded in fog. Gravesend lies over 200 ft. above the river and its ample, well drained landing area is, as we have often remarked, on the direct line to Croydon for the K.L.M., Luft Hansa, and Sabena services. All these lines are alive to the advantages of using Gravesend when Croydon is "in the murk," and fifteen of their machines landed there last year.

Communication with London has been speeded up considerably and, by arrangement with London Transport, a *Green Line* motor-coach is brought up to the aerodrome immediately it is known that a machine will land. Traveling by the new arterial road, this bus can get passengers to Trafalgar Square comfortably in 50 to 55 min. It must also be remembered that they will have saved something in the region of fifteen minutes' flying by landing at Gravesend instead of Croydon, a matter of no small importance, not only in the question of time saved, but also to the air transport companies themselves, having regard to the amount of flying time saved which would

come to a considerable amount spread over the whole year.

Full Customs facilities are now provided, and passengers' goods and freight can be cleared with a minimum of delay both in and out. The company has recently provided excellently appointed offices for this work. As soon as the volume of traffic warrants it, it is hoped to have a resident Customs inspector. At the present time he is fetched from Tilbury in considerably less than half an hour.

There is no flying club as such at Gravesend, but only an aerodrome club for social purposes, Gravesend Aviation, Ltd., doing all the flying instruction which is required; for this purpose they keep two "Moths" ("Gipsy I") and one "Fox Moth," which is also used for charter work.

A considerable amount of ground adjoins the aerodrome, which is available for manufacturers and repairers. At the present time the Percival Aircraft Company maintains a staff there, and there are rumours of a very fast new aeroplane coming out shortly. If these are substantiated we should not be surprised, seeing that Capt. E. W. Percival is an Australian, to hear that he was going to uphold British aviation in the MacRobertson race to Melbourne.

MARKINGS ON CIVIL AERODROMES

NOW that there is greatly increasing interest in the establishment of civil aerodromes, the number of people, municipal authorities and others, who are desirous of knowing just how an aerodrome should be laid is rapidly becoming large. We have therefore obtained permission to publish the following Air Ministry notes on the subject of Aerodrome Markings. It should be noted that any reasonable departure may be made from the system at the discretion of the Air Ministry. The suggestions made by the Aviation Department of the Automobile Association, which has done a very great deal of work on the subject, are: (1) The Elevated Boundary Markers should be erected on supports that can readily be broken; then, in the event of an aircraft colliding with these, little damage, if any, would result to the aircraft. (2) All concrete ground markings should be finished with a convex sloping feather edge; then, should the surrounding soil subside, no protruding edge of concrete will be left to catch in the tail skids of aircraft.

The following is the text of the Notes:—

All sites intended to be licensed for use permanently as aerodromes are to be marked in general in accordance with the system described below. Any reasonable departure from this system may, at the discretion of the Air Ministry, be permitted and the precise dimensions of marking need not be rigidly adhered to.

(A).—A circle of the dimensions given in the sketch herewith should be located approximately in the centre of the landing area. Should the licensee desire to display the name of the aerodrome, it should be shown due south of the circle and 100 ft. distant from it, in bold letters. The line of the lettering should run from west to east so that the letters may be read by an observer looking northwards.

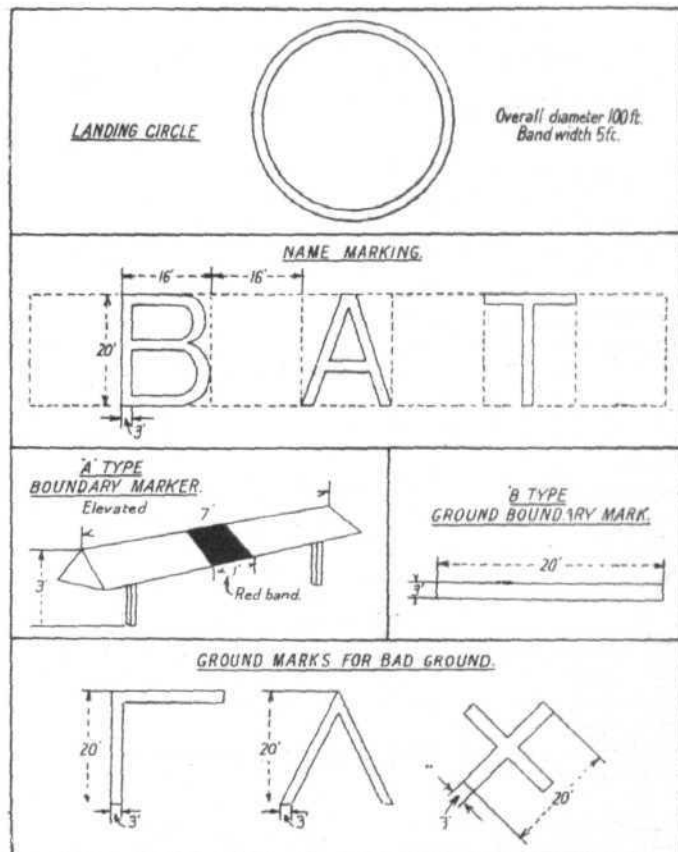
The circle and letters should be of chalk, concrete or any other substance which will show up well against the natural colouring of the aerodrome surface. The chalk, etc., must not protrude above ground level or offer any impediment to the free passage of aircraft over it. Further, it is to be firm and capable of taking the weight of any aircraft either in motion or stationary.

(B).—Two types of corner markings are recommended for use on aerodromes: type (A), which stands up to three feet above ground (see sketch); type (B), which is flush with ground level.

Type (A) can be made of wood or any other convenient material. It should be painted in such contrasting colours as local conditions may render most suitable. In most cases, however, white with a broad red band will be most conspicuous.

Type (B) is constructed in a similar manner to that explained for the circle and lettering.

When the boundaries of the landing area consist of hedges or fences clearly visible from an aircraft either in the air or on the ground, corner markings may be dispensed with or, if desired, a type (B) marking may be used. When, however, a boundary cannot be clearly discerned by the pilot of an aircraft taxiing on the ground, type (A) should be employed. In addition, it will probably be necessary to supplement this type of marking with a



(B) type, in order to render it more visible from the air.

(C).—When boundaries are of such a nature as cannot be easily seen from the air, e.g., wire fences, markings of type (B) should be placed along them at convenient intervals. If necessary, markers of (A) type may be placed at intervals along the boundary in order to render it more conspicuous to the pilots of machines landing or taxiing on the ground.

(D).—The marking of ground under repair or otherwise unsuitable for the safe passage of aircraft is an important obligation upon the licensee of an aerodrome. The system of marking recommended is shown on the sketches herewith.

(E).—No lettering or sign which may be mistaken for a recognised marking or signal or which may in anywise confuse a pilot may be displayed within the landing area. Grass bordering on any type of marking should be kept well mown, as this renders the marking much more visible from the air. At least one efficient wind indicator must be provided. The indicator must show accurately the direction of any wind of a velocity of over three miles per hour and must be visible from a height of 1,000 ft. under conditions of good visibility.

"ETHYL"

By Mr. F. R. BANKS, given before the R.Ae.S. on January 8, and reported in "Flight" on January 25

THE CHAIRMAN (Mr. D. R. Pye, Deputy Director of Scientific Research), in introducing the lecturer and calling upon him to deliver his lecture, said that the paper was one of the most important laid before the Society for some time, and amply justified, if any justification were needed, the recent election of Mr. Banks as a Fellow of the Society. Mr. Banks was a member of the technical staff of the Ethyl Export Corporation, and in his lecture he had stated with complete frankness, all the troubles, so far as he had encountered them—and he had probably met every one—which were liable to be met with through the employment of tetraethyl lead in aero engine fuels. He described how these troubles could be dealt with, how they might affect future development, and suggested means whereby they might be overcome.

In opening the discussion following the lecture, the CHAIRMAN referred to the knock-testing work which was done under the auspices of the sub-committee of the Institution of Petroleum Technologists, of which the speaker himself was Chairman. The work, he said, would be continued, and a programme had been laid down which covered lead values up to an octane number of 87 and over a wide range of concentrations of lead. Probably the test rules would go up to "7 c.c." of lead.

The sub-committee hoped to carry out some tests on two or three fuels running on complete engines, and for detecting the effect of varying octane numbers thermocouples would be used as Mr. Banks had suggested. The temperature plug was also being looked into at Farnborough, and he thought it was possible that the plug might be developed to the point of being a more satisfactory method of detecting detonation than the bouncing pin. The C.F.R. Committee—an American committee—considered that the bouncing pin should be retained as a method of protection. The methods of knock testing, developed within the last two or three years, were to be considered only as preliminary.

MR. H. C. MANSELL (*Bristol Aeroplane Co., Ltd.*) said that the Bristol Company had long felt that tetraethyl lead was the only practical antidetonant which would enable fuel for aircraft engines to be brought up to the necessary standard of continuing progress. Among the difficulties was the maintenance of a really gas-tight exhaust valve. With ordinary fuels, slight distortion might not lead to serious trouble, but with tetraethyl lead corrosion might start and burning rapidly take place. By changing the insert material, however, and detailed attention to the valve base itself, tests had been successfully carried out with the "4 c.c." concentrations on the full specification D.T.D. 230, with substantial increase in horse-power and a gain in fuel economy. This was regarded only as the starting point, and it was hoped, during the next few years mean pressures of 160 to 200 lb. per sq. in. would come about.

Mr. Banks had raised the question of fuel matching; the speaker felt that an international agreement would be most valuable at the present time, as the octane value always had to be referred to the method of testing.

THE CHAIRMAN said that the I.P.T. was working in closest co-operation with the C.F.R. Committee in America, so the international agreement was on the way to being achieved.

MR. O. THORNYCROFT (*Ricardo & Co., Ltd.*) desired to ask whether Mr. Banks had found any effect on the carbon deposit due to fairly large concentrations of lead. Mr. Banks had referred to the effect of detonation in increasing the temperature in the cylinder and to this overheating as the cause of increased carbon deposits, and of rings sticking or gumming. In this connection, experiments in which the speaker had been concerned were of interest. Steps were taken to maintain a constant cylinder temperature and to ascertain the rate of piston-ring gumming, with and without detonation. Quite a small degree of detonation greatly increased the rate of ring sticking, owing to carbon deposits in the grooves. The actual test was carried out on a small air-cooled single-cylinder unit. At a high temperature (270° C.) with the object of getting ring sticking in the shortest possible time, it was found possible in 10 hours to get a reduction of clearance in the ring grooves, due to carbon deposits, but with no sticking, provided detonation was absent. With only slight detonation, the cylinder temperature still being constant, it was found that the ring could be completely stuck in five hours.

MR. A. C. LOVESEY (*Rolls Royce, Ltd.*), said that on behalf of his firm he had carried out extensive investigations on valve burning with leaded fuel. He fully supported the theory of the mechanism of failure advanced by the author, *i.e.*, one of the chief differences observed between the behaviour of valves which had operated with leaded fuel, and those with ordinary straight fuel was that after a short period of running—three or four hours—a fairly hard scale formed on the valves which had been running with leaded fuel, and this seemed to increase in thickness with the period of running. Micro-photographs showed this highly-glazed scale to have a thickness of about 0.002 in., rather thicker on the outer edge of the valve, tapering towards the inner part. Lead attack he had seen, started in the form of V-shaped fissures from the outside of the valve, gradually getting deeper right across the face, then there was a very rapid failure caused by the blow-pipe effect of the exhaust gas blowing through on explosion. He had found it beneficial

Some notes on the discussion in connection with the lecture

to pay careful attention to the design and fitting of the valve seating insert. It was difficult to associate the distortion with the author's theory, because valves running with unleaded fuel did not give trouble with burning out. Possibly when distortion took place in the presence of the scale caused by leaded fuels, the unit loading went up on some portions of the scale, causing it to break down.

Some of the most satisfactory valves in his experience had been uncooled valves running at from 750 to 800 deg. C. In the early stages it was thought that valve temperature was important, and he had tried cooling valves with sodium. The heads of the valves were fully cooled, the sodium coming within 0.10 in. of the valve seating, but these valves gave trouble more quickly than uncooled valves.

He had not found much difference in the range of materials tried, which was from chrome steel to austenitic steel of the K 965 type. Stellite steel had worse results than ordinary valve steel, the scale flaking off much more quickly. Stellite sparking plug tips, to prevent erosion or burning away, had not been very successful. Some American firms used large exhaust valves having some flexibility, in order to obtain more uniform bending of the valve under working conditions, preventing high pressure on the scale and avoiding breaking down of the surface.

In trying to bring up the lead effect quickly, tests were run on valves raised off their seats slightly to imitate the distortion, but in that case no lead attack occurred. That was possibly due to the absence of hammering to form the scale. It seemed that this burning-out effect only occurred with a certain size orifice which did not permit sufficient cooling down.

MR. F. A. FOORD asked if, with the higher concentrations of lead, the author was satisfied that the conditions of storage advocated were adequate to prevent corrosion, because corrosion in storage was important for the R.A.F., and there were rumours of trouble in that respect.

Secondly, were the conditions of a type test on the bench comparable with those in the air. Again, were 100 hours on the test bench sufficient to show up the difference between a small quantity and a large quantity of lead in the fuel.

MR. H. B. TAYLOR (*Armstrong Siddeley Motors, Ltd.*) felt that the author had skated rather lightly over corrosion attack. He was not referring to storing engines, but to keeping engines in aircraft for a week, when it was not possible to pour pints of oil into the cylinders to prevent corrosion, especially when some cylinders were upside down.

One of the biggest setbacks with leaded fuel was the case in America when a number of people were killed by a breakdown in the plant. He was happy to know that all that had now been overcome, and that everything was perfectly safe to handle in use.

Steel seats to valves seemed to be the solution of the problem of the use of leaded fuel. He had known of cases where steel seats had been quite satisfactory with leaded fuel, but not with a straight fuel, and that was in all probability due to the layer formed by the lead, which seemed to be a useful thing to have. Up to date, using steel, he had not found any real cases of valve burning, and from his experience it seemed that the air-cooled engine was much better off using leaded fuel than was the water-cooled engine. One reason was the higher operating temperature which disposed of the products more efficiently.

MR. G. BUTTERFIELD (*Pratt & Whitney Aircraft Co.*) said that many of the points brought out, particularly as to the effect of benzol as compared with lead, and the different amounts of lead or combinations of the two, had been borne out by his own experience.

MAJ. G. P. BULMAN (*Assistant Director (Engines) D.S.R. & T.D.*) said that whilst he did not accept the Chairman's invitation to open the discussion because he had nothing technical to offer, it would be churlish of him to neglect this opportunity of expressing to the author on behalf of his colleagues and himself at the Air Ministry and indeed the aeronautical industry generally, their very deep sense of gratitude for the extraordinary help the author had been in connection with the use of leaded fuels generally, and the employment of these fuels in the Air Force which had been going on for the past two years. Mr. Foord had stated that the author had the entrée to all the English firms, and it should be added that that entrée was gained by the author's personality, complete absence of mystery and hot air, having no axe to grind, extraordinary fund of common sense, and the feeling he inspired that whether his firm was interested or not, the truth of the matter was his sole concern. The author faced up to bad results as well as good ones, and did not try to explain them away. He was only out to get the truth and to ensure sound progress.

MR. P. W. S. BULMAN (*Hawker Aircraft, Ltd.*) said that as representing the aircraft side of the industry as distinct from the aero engine side, he wished to say how much the author had assisted users of T.E.L. Flying in aircraft with concentrations of 3 or 4 c.c. of lead per gallon, he had found that with the engine fully supercharged it was possible to run for a short period at full throttle with an increase of power amounting to 60 or 70 per cent., and it should be realised what an advantage that could be in certain conditions. For instance, the possibility of aircraft having to take-off from fields where emergency landings had been made, and of military aircraft in times of emergency being compelled to operate their fully supercharged engines at low altitudes. He wished to emphasise that in his experience engines did not seem to suffer at all from the use of leaded fuel for short periods under these conditions.

THE CHAIRMAN, before calling on the author to reply, associated himself with what Major Bulman had said with regard to the great assistance that had been rendered by the author in regard to the use of leaded fuels. It was stated that tests on single cylinders were difficult to compare with those done on complete engines, and it was to be hoped that that would be explained a little further. Detonation was a thing which happened in a cylinder independently of the remainder of the other cylinders in an engine, and if there was a single cylinder working under conditions representative of the worst cylinder in a multi-cylinder engine, would not the knock-rating arrived at for that single cylinder co-relate with the knock rating obtained for the multi-cylinder engine.

THE LECTURER—who promised to deal in writing more fully with some of the points raised—said he was glad the Chairman had raised the question of the co-relation of tests because that really wanted going into. With regard to the comparison of a single-cylinder with a multi-cylinder engine, he had meant the simile to apply as much as pos-

sible to conditions in flight. It was not possible to go up in an aeroplane every time one desired to test a fuel, but it was possible to take a multi-cylinder engine and put a draught on it and expect to get no worse conditions than when in flight. There were things like distribution, radiation effects, etc., in a multi-cylinder engine which it was not possible to parallel in the case of a single-cylinder job.

He was fully in agreement with the need for an international method of matching fuels. At the present time things were perfectly hopeless.

On the point raised by Mr. Thornycroft, the view was held that with leaded fuel there was less formation of carbon over a long period than with unleaded fuel. A skin of lead bromate was formed, but it did not seem to mount up very quickly.

A great deal of what Mr. Lovesey had said could be explained, but he would prefer to do it in writing. He believed there was something in keeping the valve hot, because the boiling point of lead bromate was fairly high—about 920 deg. C.—and the engine would have to be cooled down very much before there was condensation, and

therefore the hotter the valve was when the lead bromate was flowing past in the form of a gas the better it might be for it. It did not seem to hang on to or condense on the side. It was known that the gas itself, as such, was liable to attack a hot valve, theoretically, much more than a cooler one, and it seemed a retrograde point of view to take that a valve should be run hot in any case. Normally, the idea should be to run a cool valve, because some lead bromate tests that had been made on various steels at a given temperature—although not as high as he would like, and he intended to carry out some others at the temperature of the valve—indicated that the rate of attack increased very rapidly with the increase in temperature. As regards Stellinging, there was possibly something in Mr. Lovesey's theory that the scale did not adhere.

As regards corrosion, mentioned by Mr. Foord and Mr. Taylor, this problem would have to be studied because no prolonged tests on corrosion had been made in this country, with the present fuels and lubricating oils.

Any question of trouble from poisoning had been completely eliminated now.



THE DEVELOPMENT OF THE FLEET AIR ARM

A Lecture, abridged, delivered by Wing Com. W. R. D. Acland, D.F.C., A.F.C., before the Royal United Service Institution, on January 24, 1934

WING COM. ACLAND'S lecture was to a large extent a recapitulation of his very able paper delivered before the Royal Aeronautical Society on January 22, 1931 (fully reported in FLIGHT for January 30, 1931.—ED.). It was, however, remodelled considerably in order that the development of the Fleet Air Arm, from the earliest beginnings, should receive more attention than actual deck flying, which was the subject of the previous paper.

The lecturer traced the beginnings of naval flying from the year 1911, when H.M.S. *Hibernia* was fitted with a launching deck, down through the war period, when ships like the *Engadine*, *Manxman* and *Campania* were used, to more modern times with properly built aircraft carriers like the *Furious*, *Glorious*, *Courageous*, *Hermes*, etc.

With regard to the organisation, it was in January, 1918, that Rear Admiral Sir Richard Phillimore first assumed command of that branch of the Service which has ultimately become the Fleet Air Arm, and flew his flag in H.M.S. *Furious*. This ship then had the funnel amidships, although an after flying-on deck had been added since she first joined the Fleet. This deck was not, however, a success and of the landings made on it in one period Wing Com. Acland stated that all except three resulted in crashes, chiefly due to the eddying air currents caused by the funnel and its superstructure. Fore and aft wires were still used for landing-on, with hooks on the under-carriage which were designed to get under the ropes and to hold the aircraft down on the deck after landing.

In September, 1918, the *Argus* was commissioned, and was the first fully clear and flush-decked aircraft carrier. Next came the *Eagle* (converted from the *Almirante Cochrane*, a Chilean battleship which we had taken over) and she was the first island-type carrier with the funnel and bridge on the starboard side of the 84-ft. wide flying deck.

In March, 1918, although the aircraft provided for Fleet use, from the carriers *Furious* and *Pegasus*, were such as to give our Navy superiority in the air, there was, as yet, little hope of landplanes getting back on to the *Furious*, and the usual procedure was for them to land in the water, whence they were sometimes salvaged by destroyers, but more often than not became total losses in the process. The advent of the *Argus*, however, solved this problem.

In 1919 capital ships ceased to be equipped with aircraft. In 1920 they were re-equipped, but it was not until after 1924, when the *Vindictive* had carried out successful experiments with a catapult and proved its practicability, that this form of launching gear made the use of reconnaissance aircraft general in cruisers and capital ships once more.

On April 1, 1923, the aircraft used by the Fleet were organised in flights of six machines. The status of the Fleet Air Arm was also consolidated and clarified at that time as the outcome of a committee under the chairmanship

of Lord Balfour. The principle of a unified Royal Air Force was agreed to, but for all matters of operational control the aircraft of the Fleet Air Arm were definitely to be under the command of naval officers. The observers were all to be naval officers, as were 70 per cent. of the pilots, who received temporary commissions in the R.A.F. The remaining 30 per cent. of pilots were to be officers of the R.A.F. Senior R.A.F. officers were also to act as advisers to the C. in C. and to be senior officers for air duty in each carrier.

During 1926 observers' courses were started at Lee-on-Solent and there naval officers were taught photography, meteorology and air navigation, as well as the many other subjects necessary for their specialised duties. Pilots were trained, in the first place, much on the same lines as those in the R.A.F., but during their eleven months' course at Leuchars they learnt seaplane work and deck landing. During 1927 the air course for junior officers was started, and this has proved that officers are able to get a far better idea from the air of handling the Fleet than they are able to do when afloat.

The lecturer referred briefly to the developments which had taken place in technical improvements since 1928, such as the general use of slots, wheel brakes, and provision for night flying. He thought that night flying and night deck landing, started by Sqd. Ldr. Howe in 1927, would now become a regular part of F.A.A. work.

In 1932 Rear Admiral R. G. H. Henderson was appointed Rear Admiral Commanding Carriers, and thus came about the separate Fleet Air Arm command. The lecturer felt that it was due to the work of Admiral Henderson in conjunction with Air Vice-Marshal Sir Robert Clark-Hall, the Air Officer Commanding the Coastal Area, that the Fleet Air Arm is now developing in such a satisfactory manner.

In 1933 the F.A.A. was organised once more in squadrons. This permitted the appointment of many more naval officers to the higher ranks in the F.A.A.

The standard of flying had improved so much that the percentage of successful deck landings had become equal to that of landings ashore, while the amount of flying done by the pilots of the F.A.A. had also become equal to that of pilots on land aerodromes.

Speaking of the future, Wing Com. Acland thought that it had now been proved that aircraft were as essential to the Fleet as were its big guns; that aircraft operating with the Fleet must be ship-borne and must be landplanes; and that aircraft carried by capital ships and cruisers would have to be flown off before action as, not only might they be damaged by the gun blast, but also that the presence of large quantities of petrol on deck constituted a very real danger. This was likely to be inconvenient to the C. in C., and was therefore a reason why, for Fleet use, aircraft should be confined to carriers. Alluding to the vulnerability of carriers, he pointed out that capital ships also had to have their destroyer escort and that a carrier should be treated on the same basis.

The Industry

THE D.H. ENGINE DEPARTMENT DINNER

HOW happy is that feeling of "something attempted something done," especially when the "something" is such an achievement as the "Gipsy Six" engine. This engine, as most of our readers know by now, made its first public appearance last week. By a happy coincidence the date of the Annual Dinner and Dance of the de Havilland Engine Department (which we are assured was fixed six months ago) fell on Saturday, January 22, and this gave the engine department an opportunity to celebrate the "happy event," which they did in real D.H. style.

Mr. R. HUTCHINSON, Works Manager of the Engine Department, explained that last year's dinner, being the first of its kind, and many of those present having lots of nice things to say about each other, the speeches were rather lengthy. This year the toast list was brought down to an irreducible minimum. For the edification of those who were to speak Mr. Hutchinson said it was not intended to let them off lightly, but to provide them with plenty of time to say "all the nice things."

Mrs. NIXON, wife of the Secretary, on being asked by Mr. Hutchinson to respond to the toast of the ladies, stipulated that she had not the slightest intention of being limited to time and demanded the prerogative of the members of her sex. She was given one hour on the programme.

In dealing with the firm Mr. Hutchinson said that last year the absence, through illness, of Mr. Alan Butler was regretted. Everyone was proud and grateful to see Mr. Butler back at the dinner and were equally grateful for the presence of nearly all the other directors.

One director who was not present was Capt. De Havilland himself. He had felt compelled to rest after his strenuous efforts in connection with the D.H. 86. He would however be thinking of those at the dinner. On behalf of the engine department Mr. Hutchinson congratulated the Board on the progress of the firm during the past year and hoped for the continued success of their products, with the manufacture and good name of which he was so proud to be associated. Mr. Hutchinson also congratulated the Aircraft Department on their outstanding achievement of the production of the "86," which, without doubt, was a record. He hoped that the machine would be a record breaker in every sense of the word. After welcoming the ladies Mr. Hutchinson expressed his pleasure at the presence of Air Ministry officials in the persons of Major Ross, who represented Research and Technical Development, Mr. Hitchcock, from A.I.D. Headquarters, not forgetting

D.H.'s own resident A.I.D. inspectors Mr. Grace and Mr. Rawlins of whom far too much was seen during the daily work, but who were very welcome that evening. Mr. Hutchinson expressed keen appreciation of the help and courteous co-operation of these gentlemen and those of other departments of the Air Ministry with whom he came in contact. He welcomed friends from Hatfield and congratulated those responsible for the organisation of the dinner.

Mr. ALAN BUTLER, in replying, congratulated the Engine Department on its work. It was, he said, much younger than the aircraft side, as it started only a few years ago, but he pointed out it had produced over 1,400 Gipsy I engines, nearly 300 Gipsy II's, 500 Gipsy III's and 400 Gipsy Majors—a total of close on 3,000 engines. In addition, the department had turned out a few Gipsy Six engines. Mr. Butler then referred to the presence of Major Halford, the designer of all these engines, and congratulated him on his success. He also congratulated the Engine Department on the way in which it produced the Gipsy Six, from its inception to the finished product, within a few short weeks. He expressed his confidence that the new engine had a tremendous future. It was the job of the directors, he said, to think of the kind of engines to be produced, and the job of the Engine Department to make them. The task of the Directors was all the easier when they knew that whatever they decided to produce, it would be made "right" without undue waste of money. Mr. Butler congratulated Mr. Hutchinson on his splendid work to this end, and drank to the continued success of the Engine Department.

Mrs. NIXON, wife of the Secretary, did not take advantage of the hour, but replied very charmingly on behalf of the ladies who, she said, were delighted to be there.

Mr. CLEMON, on behalf of the men, said that he did not intend to spoil, by speaking, the good time which everyone was having so far.

Mr. HEARLE, a Director of the Company, proposed the toast of the Chairman, Mr. Hutchinson, and congratulated him on a successful evening. It was usual, he said, with Mr. Hutchinson, that everything he tackled was attended by success. Mr. Hutchinson made a world of difference to the work of the Directors and there was no need for them to worry about the engines. They simply said that certain engines were required by a certain date, and no matter how great the task, the engines were always ready the day before they were asked for. This, said Mr. Hearle, spoke worlds of the efficient way in which Mr. Hutchinson had organised the Engine Department, and he drank to the health of one who was an example to all in doing his job.

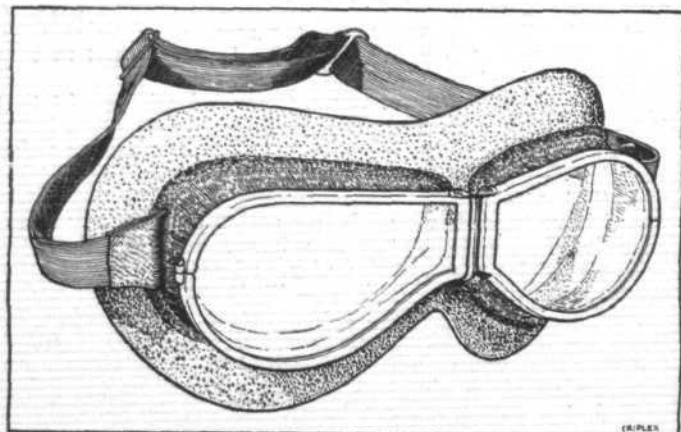
Mr. HUTCHINSON, in responding, said that all the thanks he required were the happy faces round him. He was merely the flag at the top of the staff. All the people who worked with him were really responsible for the success of the Engine Department.

A LARGE SHIPMENT OF DOPE

DOPE for aircraft wings is a material which one classes with those things of which, "a little goes a long way." So the amount of work which can be done with a quantity like 42 tons must be staggeringly large. Yet this is the quantity which Cellon, Ltd., have just shipped to the Turkish Government. This order was all sent in one day from the factory at Kingston, by lorries to Allsop's Wharf, on the Thames at Wandsworth. From there it went by one barge to the West India Docks and was transhipped to S.S. *Grodno*. Speed of delivery was one of the terms of the contract, and the whole of this quantity was manufactured within four weeks from the day the order was given. The shipment day was a very foggy one, a hinderance not only to the lorries taking the dope to Wandsworth,



but also to our photographer. However, he managed to get the accompanying photographs, which show the dope being transferred from the lorries to the barge. (FLIGHT Photos.)



COMFORTABLE GOGGLES

WE have received a pair of goggles from D. Lewis, Ltd., 124, Great Portland Street, W.1, the design of which would appear to eradicate the trouble present in many other goggles due to air blowing up between the bridge piece and the face and thus making the eyes water. These goggles have a complete sponge rubber mask specially shaped so that it fits close to the face and does not press upon the bridge of the nose at all. They have Triplex Safety Glass lenses and a ventilated frame, while the shape of the lenses gives the widest possible angle of vision.

COMFORT AND SAFETY: A sketch of the pair of Goggles, supplied by D. Lewis, Ltd., referred to above. They are fitted with Triplex Safety Glass lenses.

THE ROYAL AIR FORCE

London Gazette, January 23, 1934

General Duties Branch

Air Commodore W. L. Welsh, D.S.C., A.F.C., is appointed Director of Organisation and Staff Duties, Air Ministry (Jan. 15).

The follg. flight cadets, having successfully passed through the R.A.F. College, Cranwell, are granted permanent commns. as Pilot Officers with effect from and with seny. of Dec. 16, 1933:—C. C. Francis, M. Dawney, J. D. Nelson, A. T. D. Sanders, L. B. B. King, G. C. Eveleigh, C. R. J. Pink, G. Thrupp, K. D. Stanion, J. N. Knowles, J. Thompson, D. E. B. Wheeler, C. H. Brandon, C. J. P. Flood, G. A. Mills, H. M. T. Eversfield, G. F. L. Scott, E. C. Harding, D. P. Hanafin, A. O. D. Cox, J. A. H. Tuek, R. G. Prier, A. E. Cairnes, D. P. Barclay, A. V. Sawyer, J. B. Ussher.

Flt. Cadet P. H. Agard Butler, having successfully passed through the R.A.F. College, Cranwell, is granted a permanent commn. as Pilot Officer on probation with effect from and with seny. of Dec. 16, 1933. C. M. B. Renshaw is granted a short-service commn. as Pilot Officer on probation with effect from and with seny. of Jan. 13; Lt. C. A. N. Hooper, R.N., is reattached to R.A.F. as a Flt.-Lt. with effect from Jan. 15 and with seny. of Jan. 1, 1933; Lt.-Comdr. J. B. Heath, R.N., Flt. Lt., R.A.F., ceases to be attached to R.A.F. on return to Naval duty (Jan. 8); Wing Comdr. W. H. Dunn, D.S.C., is restored to full pay from half-pay (Jan. 7); Sqdn. Ldr. E. J. D. Routh is restored to full pay from half-pay (Jan. 14); Sqdn. Ldr. R. V. Goddard is placed on half-pay list, scale A, from Jan. 5 to Jan. 7 inclusive; Sqdn. Ldr. J. F. Gordon, D.F.C., is placed on half-pay list, scale B, from Dec. 15, 1933, to Dec. 21, 1933, inclusive. The short-service commn. of Acting P/O. on probation D. F. Walker is terminated on cessation of duty (Jan. 20).

Stores Branch

P/O. on probation R. C. V. Ash is confirmed in rank and promoted to the rank of Flying Officer (Jan. 6).

Accountant Branch

Flt. Lt. F. J. S. Short is placed on retired list on account of ill-health (Jan. 24).

Medical Branch

The following are granted short-service commns. as Flying Officers for three years on the active list, with effect from Jan. 8 and with seny. of the dates stated:—H. Bannerman, M.B., B.S. (Jan. 8, 1933); I. MacKay,

M.B., Ch.B., D.P.H. (Jan. 8, 1933); W. P. Stamm, M.R.C.S., L.R.C.P. (Jan. 8, 1933); H. S. Barber, M.B., B.Ch. (July 18, 1933); D. R. Crabb, M.R.C.S., L.R.C.P. (Jan. 8).

Flt. Lt. H. W. Corner, M.D., Ch.B., is promoted to rank of Sqdn. Ldr. (Jan. 24); F/O. L. M. Corbet, M.B., B.S., is promoted to rank of Flt. Lt. (Jan. 16); Flt. Lt. (Hon. Sqdn. Ldr.) H. E. H. Tracy, M.R.C.S., L.R.C.P., L.D.S., relinquishes his temp. commn. on completion of service, and is permitted to retain the honorary rank of Sqdn. Ldr. (Jan. 23).

Memorandum

12601 Cadet A. J. Hillier is granted an hon. commn. as Sec. Lt., with effect from the date of demobilisation.

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

The following are appointed to the permanent service (Jan. 1):—Sister.—Miss G. E. Butler. Staff Nurses.—Miss C. I. Walker, Miss V. Cummings, Miss G. P. Taylor, Miss E. L. Elias, Miss F. B. Ashworth, Miss A. M. Tisdall, Miss E. Happer, Miss W. E. Denson, Miss M. H. Duff.

ROYAL AIR FORCE RESERVE RESERVE OF AIR FORCE OFFICERS

General Duties Branch

F/O. F. J. Phillips is transferred from Class A to Class C (Jan. 6).

SPECIAL RESERVE

General Duties Branch

P/O. on probation F. F. Rainsford is confirmed in rank (Jan. 8); P/O. A. Andrew is promoted to rank of F/O. (Nov. 15, 1933).

AUXILIARY AIR FORCE

General Duties Branch

No. 600 (CITY OF LONDON) (BOMBER) SQUADRON.—P/O. J. M. Wells is promoted to rank of Flying Officer (Dec. 11, 1933).

No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—F/O. C. M. B. Renshaw relinquishes his commn. on appointment to a short-service commn. in the R.A.F. (Jan. 13).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captains: A. G. R. Garrod, O.B.E., M.C., D.F.C., to Air Ministry, Dept. of C.A.S. (D.O.S.D.), 15.1.34, on appointment as Deputy Director of Organisation, vice A/Cdre W. L. Welsh, D.S.C., A.F.C. R. H. Peck, O.B.E., to Air Ministry, Dept. of C.A.S. (D.O.I.), 13.1.34, for duty as Deputy Director of Operations and Intelligence, vice G/Capt. A. T. Harris, O.B.E., A.F.C.

Wing Commanders: H. H. MacL. Fraser, to H.Q., Air Defence of Gt. Britain, Uxbridge, 11.1.34, for Equipment (Engineer) Staff duties, vice G/Capt. J. Sowrey, A.F.C. E. D. Johnson, A.F.C., to H.Q., Central Area, Abingdon, 13.1.34, for Personnel Staff duties, vice S/Ldr. A. Durston, M.C. F. J. Linnell, O.B.E., to No. 99 (B) Sqdn., Upper Heyford, 13.1.34, to command, vice W/Cdr. E. D. Johnson, A.F.C.

Squadron Leaders: J. S. Chick, M.C., A.F.C., to Station H.Q., Duxford, 15.1.34, for Flying (Flying Instructor) duties, vice S/Ldr. H. I. T. Beardsworth, N. P. Dixon, A.F.C., to Air Ministry, Dept. of A.M.P. (D. of P.), 16.1.34, for Personnel Staff duties, vice W/Cdr. R. G. Gardner, D.S.C. A. C. Collier, to No. 12 (B) Sqdn., Andover, 13.1.34, to command, vice W/Cdr. D. F. Stevenson, D.S.O., M.C. E. J. D. Routh, to No. 5 Flying Training School, Sealand, 15.1.34, for Administrative duties, vice S/Ldr. C. H. Stilwell, K. B. Lloyd, A.F.C., to No. 205 (F.B.) Sqdn., Singapore, 6.1.34, for flying duties, vice S/Ldr. B. McEntegart, L. G. Maxton, A.F.C., to H.Q., Far East Command, Singapore, 6.1.34, for personnel staff duties. H. S. Scroggs, to H.Q., Far East Command, Singapore, 6.1.34, for navigation duties, vice S/Ldr. F. L. Hopps, A.F.C. I. M. Rodney, to Air Ministry, Dept. of C.A.S. (Signals Branch), 18.1.34, for Air Staff (Signals) duties, vice F/Lt. J. A. McDonald.

Flight Lieutenants: F. Beaumont, to No. 57 (B) Sqdn., Upper Heyford, 9.1.34. T. N. McEvoy, to No. 1 (F) Sqdn., Tangmere, 15.1.34. G. F. Macpherson, to No. 603 (City of Edinburgh) (B) Sqdn., Turnhouse, 10.1.34. G. B. M. Rhind, to No. 54 (F) Sqdn., Hornchurch, 15.1.34. S. J. Smetham, to H.Q., Western Area, Andover, 11.1.34. C. S. Riccard, to No. 205 (F.B.) Sqdn., Singapore, 6.1.34. L. H. Stewart, to H.Q., Far East Command, Singapore, 6.1.34. H. H. Chapman, to R.A.F. Base, Singapore, 6.1.34. B. W. T. Hare, to R.A.F. Base, Gosport, 18.1.34. A. C. B. Harrison, M.C., to H.Q., Fighting

Area, Uxbridge, 18.1.34. J. A. McDonald, to No. 41 (F) Sqdn., Northolt, 18.1.34.

Flying Officers: J. W. A. Hunnard, to No. 811 (F.T.B.) Sqdn., Gosport, 11.1.34. F. A. Wardell, to No. 500 (County of Kent) (B) Sqdn., Manston, 11.1.34. R. C. Gaskell, to R.A.F. Base, Gosport, 5.1.34. A. G. F. Stewart, to No. 205 (F.B.) Sqdn., Singapore, 6.1.34. G. E. Strangman, to R.A.F. Base, Calshot, 1.1.34.

Pilot Officers: J. R. A. Peel, to No. 801 (F.F.) Sqdn., Netheravon, 5.1.34. H. P. Burwood, to No. 824 (F.S.R.) Sqdn., Far East, 6.1.34. R. T. Smith, to No. 36 (T.B.) Sqdn., Singapore, 6.1.34. F. B. Chapman, to R.A.F. Depot, Uxbridge, 16.1.34, on appointment to a Short Service Commn. J. H. G. Sarll, to No. 99 (B) Sqdn., Upper Heyford, 11.1.34.

Stores Branch

Flight Lieutenant J. Davison, to R.A.F. Base, Singapore, 6.1.34.

Flying Officer H. M. S. Dawes, to No. 2 (A.C.) Sqdn., Manston, 15.1.34.

Accountant Branch

Flight Lieutenant C. F. Goatcher, to R.A.F. Base, Singapore, 6.1.34.

Medical Branch

Squadron Leader P. T. Rutherford, O.B.E., to H.Q., Iraq Command Hinaidi, 10.1.34, for duty as Principal Med. Officer.

Flying Officers: The undermentioned Flying Officers are posted to Med. Training Depot, Halton, on 8.1.34, on appointment to Short Service Commns.: H. Bannerman, H. S. Barber, D. R. Crabb, I. Mackay and W. P. Stamm.

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty:—

Lt.-Cmdrs. (Flight Lts., R.A.F.): C. John, reattached to R.A.F., and appointed to Victory for School of Naval Co-operation, Lee-on-Solent (Jan. 27), and to Renown. J. F. W. C. Hawkins, lent to R.A.F. for duty at R.A.F. Base, Gosport (Jan. 29).

Lieut. (Flying Officer, R.A.F.):—D. G. F. W. Macintyre, to Victory for R.A.F. Base, Gosport (Jan. 20), and to Devonshire.



The Esher Trophy

No. 605 (County of Warwick) (Bomber) Squadron has for the fourth time in seven years won the Esher Trophy. This trophy is presented each year to the squadron of the Auxiliary Air Force which wins most marks for excellence in all the functions which an air squadron has to perform, such as air pilotage, navigation, formation flying, bombing, gunnery, photography, etc. The competition between the seven existing squadrons of the Auxiliary Air Force is very keen, and a very high standard of performance is required in order to have any chance of winning the trophy. Last year's winner was No. 604 (County of Middlesex).

The commanding officer of the County of Warwick Squadron is Sqdn. Ldr. J. A. C. Wright, A.F.C., T.D.,

D.L., and the adjutant is Flt. Lt. S. D. Macdonald, D.F.C. These two officers must chiefly share the credit for the remarkably fine record of this squadron, but very great credit is also due to the enthusiasm of all the officers and airmen, most of whom are naturally drawn from Birmingham. The Hon. Air Commodore of the squadron is Viscount Bearsted, and he also takes great interest in the doings of the squadron and helps to inspire all ranks with enthusiasm. The trophy was presented to the squadron on January 29 by Col. Sir Henry Fairfax-Lucy, chairman of the county Territorial Association. In his speech he mentioned that this year No. 605 Squadron had registered the highest number of marks by which the trophy had ever been won.

AIR POST STAMPS

By DOUGLAS ARMSTRONG

(Editor of "Stamp Collecting")

Air Stamp Values

An event of some importance to collectors of air post stamps and covers has been the appearance almost simultaneously during the past month of new editions of the two standard air mail catalogues, the one in English emanating from the house of D. Field and the other in French published by Champion de Paris. Both are excellent in their respective fields, and one or other is a sheer necessity for the collector who wishes to keep *au fait* with the fluctuations of the market. The ordinary stamp catalogue is of very little service to aero-philatelists, since it takes no account of "flown covers," "semi-officials" and similar items peculiar to the air post cult. All these extraneous objects are to be found, however, listed and priced in the two specialised catalogues referred to which are exceedingly helpful guides to relative rarity.

It must always be borne in mind, however, that the prices quoted in these firms' catalogues are selling and not buying prices, and that in some cases the margin between the two is very considerable. Generally speaking, few increases are recorded, which is but natural in view of the economic and financial situation, coupled with the fact that America is temporarily "out of the market." On the other hand, there are no sensational reductions except in the case of what are known as "fancy flights," that is to say, air mail flights which served no real postal purpose and were carried out largely with an eye to possible sales of "flown covers" to air post enthusiasts with more cash than discrimination. All things considered, the air stamp market has held up remarkably well, and there are prospects of a definite revival following the holding in London of a great international air mail exhibition (A.P.E.X.) next May.

A Pioneer Balloon Post

Much interest has been aroused among air post students over the discovery of a hitherto unrecorded balloon post which was carried out at Beckenham (Kent) at the time of King Edward's Coronation in 1902. A mail of some 300 specially prepared postcards was taken up by the aeronaut Gaudron, bearing the inscription, "From the Clouds per Balloon Post," and packages were dropped near Leeds Castle (Maidstone), Lenham and St. Margaret's Bay (Dover). Only a very few examples of these balloon postcards seem to have been preserved, and the writer would be interested to hear from any reader of FLIGHT who possesses one.

The "Emeraude" Air Mail

Tragic mementos of the ill-fated air liner *Emeraude*, which came to grief on the last stage of her flight from Saigon to Paris, exist in the form of letters salvaged from the wreck of the burning plane and were received in London at the end of last week. In addition to the departure postmark of Saigon-Central, dated January 4, they bear a rectangular cachet, struck in violet, containing the inscription, "Courrier Rapide—'Emeraude'—Saigon-Paris," enclosed by a double-lined frame.

Air Stamps from Kuwait

Although Imperial Airways aeroplanes on the London-India route have been calling at Kuwait, on the Persian Gulf, since the middle of December, 1932, the local agency of the Indian post office has only now been supplied with contemporary air mail stamps of British India overprinted for use there, with the name "Kuwait" in bold sans-serif characters. The three denominations supplied in this form comprise 2 annas grey-blue, 3 annas blue, and 4 annas olive.



THE DUTCH INDIES FLIGHT: A card flown out (originally in the *Postjagger*) to Bandoeng and back to Holland per the *Pelikaan*. Note the special Dutch and Dutch Indies 30 c. stamps.

Germany's New Air Stamps

The German post office will shortly put in circulation a new set of air post stamps in an original design showing an eagle flying over the world, flanked by portraits of Count Zeppelin and Otto Lilienthal, whom the Germans claim as the inventor of controlled flight.

G.P.O. Vetoes Private Air Stamps

By virtue of its mail carrying contract with the Postmaster-General, the Great Western Railway Company was able to substantiate its right to provide distinctive stamps for denoting the special fee of 3d. levied upon letters carried over the experimental air service operated between Cardiff, Plymouth, Birmingham, etc., last summer. Not so the Provincial Air Services, who attempted to carry out a similar service between London, Southampton and Plymouth in November, 1933. The General Post Office has notified the concern that in issuing an air post label resembling a postage stamp an infringement of the post office monopoly has been committed, but that in consideration of that fact that this was done unwittingly and regret has been expressed by the proprietors for this breach of the regulations, "no further action will be taken."

In the circumstances, there would appear to be little likelihood of further private issues of air post vignettes in Great Britain, except where the services are in the hands of railway or steamship companies, and this may tend further to enhance the interest and value of the vetoed labels in the eyes of air post collectors.

INCREASE OF CAPITAL

CIRRUS-HERMES ENGINEERING CO., LTD (Aeronautical, mechanical and electrical engineers, etc., Amberley House, Norfolk Street, W.C.2).—The nominal capital has been increased by the addition of £30,000 in £1 ordinary shares beyond the registered capital of £20,000.

PATENT AERONAUTICAL SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors (The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1932

Published February 1, 1934

36,328. FAIRY AVIATION Co., LTD., and A. G. FORSYTH. Hubs for aircraft propellers. (404,135.)

APPLIED FOR IN 1933

Published February 1, 1934

3,223. FAIRY AVIATION Co., LTD., and M. F. HUXLEY. Aerofoil surfaces. (404,149.)

7,732. F. GALLEGO Y. HERRERA. Flying-machines. (404,166.)

7,978. C. LORENZ AKI.-GES. Systems and apparatus for landing aircraft by the use of electromagnetic waves. (404,167.)

20,152. A. SMOLIK. Arrangement of fixed forwardly firing-guns on aircraft. (404,224.)